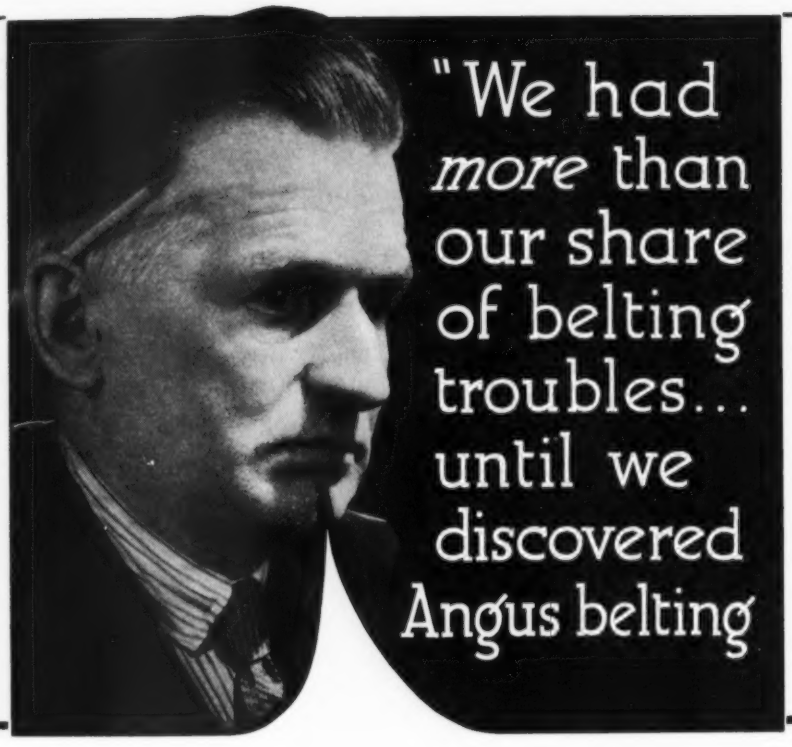
FOOD MANUFACTURE

PUBLISHERS: LEONARD HILL LIMITED, 17, STRATFORD PLACE, W.1 SEPTEMBER, 1939



"We had *more* than our share of belting troubles... until we discovered Angus belting

. . . . and it happened like this.

"Our output was suffering seriously from breakdowns, "stoppages, slipping belts and breakages. We asked "Angus to send a Belting Engineer to report upon our "belts in general. His report convinced us that we were "using the wrong type of Belts on many of our machines. "We accepted his advice and now use a specific Belt "for each machine. It has paid us handsomely in terms "of increased output."

BETTER **ANGUS** BELTING

FREE Service and technical advice is at your disposal. Send for an Augus Belting Engineer to call. :: Write Dept. F.M.

GEORGE ANGUS & Co. Ltd.
NEWCASTLE-UPON-TYNE

Branches: London, Liverpool, Leeds, Manchester, Birmingham, Belfast, Cardiff and Glasgow

FOOD MANUFACTURE

Vol. XI, No. 9 September, 1936

Better Bread and Confectionery

THE LETTER from Mr. R. N. Wheeler on the advertising of bread published elsewhere in this issue draws attention to an important aspect of the campaign that has now been in progress for some little time. It is undoubtedly necessary to strike with considerable force in an advertisement, but it is also essential to stick to scientific facts if it is to be ultimately convincing and therefore effective. There is a tremendous amount of matter published nowadays of a popular scientific nature dealing with physical training, nutrition, diet and health, not to mention broadcast talks by experts in these subjects, and though this information may not always be founded on scientific facts the average man is becoming better and better informed. Mr. Wheeler suggests an extension of the appetising appeal in advertising. Why not go further and show people pictorially in how many ways bread (or flour for that matter) can be used in preparing various dishes? Why limit the appeal to plain bread? A well-made bread and butter pudding is really excellent fare. What about pastry and the many forms of confectionery in which flour is used? In a special article on "Flour Confectionery in the Home", published this month (on page 332), Miss Phyllis Peck points to the revival of the art of cookery in the home with which is connected the increasing desire on the part of housewives to purchase so-called "home-made" confectionery. This, as she says, implies confectionery with the flavour, texture, and keeping qualities associated with confectionery made at home, for which housewives are prepared to pay more in order to obtain "that little something that some others haven't got". Mr. A. A. Horvath, surveying the outlook for Soya Flour to-day (p. 336), concludes with the remark that the baker can succeed in getting a larger share of the annual value of all confectionery made if he is wise enough to make the kind enjoyed by the housewife and her family. Again, Dr. A. M. Maiden, an authority on flour confectionery, discussing the relationship of flavour to the consumption of bread in this issue (p. 330), suggests the baking of crusty bread, which most people like, and a reduction in the size of loaves as a means of stimulating greater interest in bread eating. He confirms the conclusion that we have previously expressed in these columns, that the advertising campaign will be definitely helped by any improvement in the quality of bread as made to-day, only we have put it the other way round. The production of better quality bread is, we think, essential if a real increase in consumption is to be brought about. Our knowledge of cereal chemistry is advancing rapidly. The hygienic and mechanical developments in breadmaking and flour confectionery on a large scale have reached a very high standard. But, as we argued in February last, the making of good bread and confectionery is still a craftsman's job, and the craftsman's standards of quality at least must be maintained.

Leavening Agents

The leavening of bread is a process of considerable antiquity, but exactly when it originated is not certain. According to a treatise on breadmaking, written by Frederick Accum in 1821, the use of added yeast in breadmaking was first adopted by French bakers about 250 years ago, and even then it was done secretly. At first the practice was condemned by the College of Physicians of Paris on the grounds that it was not wholesome. Although yeast has now become the most widely accepted leavening agent for bread throughout Europe and the Western Hemisphere, there have been others. The first patent for aerated bread was granted to a man called Wright in 1832, and in 1856 Dauglish introduced the process of using water charged with carbon dioxide under pressure for doughmaking. The dough was mixed in a closed vessel at 40-lb. pressure. Of course such a bread, lacking the flavour of yeast, was somewhat insipid and was never a serious

competitor of bread made from fermented dough. Many attempts have also been made to make baking-powder breads, but these have never become popular. Recently, Bailey and LeClerc have investigated the use of hydrogen peroxide as a leavening agent, and after a somewhat laborious procedure obtained bread which had slightly more crust than yeast bread, but the crust was not so attractive as that of yeast bread. The peroxide bread had as good a grain and fully as good a volume as yeast bread and a better texture, but it had an inferior taste. We do not anticipate the commercial production of peroxide bread, which, apart from flavour, lacks the vitamins supplied by yeast.

What will the Harvest be?

At the time this note is being penned harvest has somewhat tardily begun and winter oats have been cut in Bedfordshire. We have seen some very fine fields of wheat, but the wet, sunless summer has retarded ripening, and unless there is a decided change for the better it is doubtful if the wheat will ripen fully. This is the first really bad summer since the Wheat Act came into force, and it will be interesting to see what the yield of millable wheat will be. The last three summers have been abnormally good, and it may be that the potentialities of growing wheat in this country have been over-estimated. It has always been our opinion that the normal climate and soil of England are not eminently suited to wheat growing and that the land could be put to better advantage. We are told that in addition to all the other tribulations that have worried the cereal farmer this year a further trial has come in a large increase of marauding sparrows that are playing havoc with many fields of oats and wheat. The increase of houses in the South and the extinction of sparrow clubs are said to have helped the rapid multiplication of the domestic sparrow. The yield of wheat owing to various adverse conditions will probably only be about three-quarters of good average. It is vexatious that the lean English harvest should come at a time when wheat prices are soaring to high levels. It seems perverse of Nature to ruin our harvest by an excess of rain and no sun, and also ruin that of U.S.A. by an excess of the latter and none of the former! The coming winter will probably see very high prices for bread, even though there may be no absolute scarcity. Two years ago both Canada and America were pouring wheat down the drain so great were their stocks. It is a pity they had no Joseph to counsel them to store the produce of the fat years for the lean ones that inevitably follow.

Canadian Wheat

It looks as if Nature has a great affection for Canada, for the adverse weather conditions in the United States and Argentine have saved Canada from a very awkward situation. According to a pamphlet issued by the Searle Grain Co. on the marketing of Canadian wheat, Canada's trade has decreased considerably, and while international trade in wheat decreased last year by 33 per cent. on the average of five years prior to 1929, Canada's decrease was 46 per cent. This was largely due to Canada's misguided policy of marketing her wheat, which policy has now, fortunately, been revised. The Canadian wheat pool started the trouble by the system of "orderly marketing". We have pointed out repeatedly that it is folly to interfere with the laws of supply and demand, and while it might be possible to effect some regulation of domestic trade, world markets must be treated with respect. Canada adopted a policy of withholding her wheat which resulted in the accumulation of an enormous surplus of wheat and a staggering burden of debt. Worse, she lost markets that she may never recover. Certain European countries replied to Canada's policy by growing their own wheat—as a result, whereas Germany used to import 14 million bushels from Canada her imports now are less than one million. Imports to Great Britain fell from 96 millions to 76 millions, but this was not due to domestic production. Argentina and Australia benefited in this case. As we have already said, Nature has come to her rescue and Canada may very well get on her feet again. If she is to remain so her future policy must lie in meeting foreign competition freely. Her wheat is so good that it will always be in demand, at a reasonable price, but events have shown that it is not indispensable, and we hope Canada has learned her lesson.

Gas Attacks and Food Stocks

The recent attention paid to the question of food supplies in case of war, while most important and essential, has not, as far as we know, taken into consideration what would be the effect of gas attacks on stored food in case the food became exposed to the gas. This reminds us of an article written last year by Dr. Kurt Seidel in *Die Mühle* entitled, "How can stores of cereals and cereal products be protected against chemical warfare agents

and how should damaged stocks be treated?" This article showed that in Germany, at any rate, careful consideration is being paid to the possibilities of gas attacks and their effect on food supplies. Dr. Seidel pointed out that cereals and cereal products are easily damaged by chemical warfare agents since they readily adsorb gases and vapours. In order to protect stores he suggests that the exposed surface of the stored material should be reduced as much as possible and that it should be covered with substances which will adsorb gases, thus keeping them from the stored material.

Storage of Grain and Flour

Dr. Seidel suggested that grain should be stored in high piles where possible, and flat-topped piles should be avoided. The grain should be covered with cloth strewn with fine peat or, better still, with siliceous earth, or a mixture of earth and peat. It is also effective to strew fine siliceous earth, or earth and peat, directly over the grain. Sacks of flour and bran should be piled close together and covered with cloth strewn with earth or earth and peat. Ventilated storage platforms should be avoided. It is interesting to note that mustard gas will adhere to grain for weeks, and can be removed only with difficulty, by intense aeration, spraying with chloride of lime or washing with a very dilute solution of the same and finally washing with water.

After a Gas Attack

After a gas attack the storehouses should be degassed according to the instructions of the Air Ministry, and experts should inspect the stocks to determine what gases have been used and what further treatment will be necessary. Some of the gases can be removed by simple aeration, but a large share of the modern warfare agents are difficult to remove, even from substances with a low moisture content. Grain should be washed after a gas attack and the bran destroyed and not added to the regular mill bran. Flour and bran should be dumped out of the sacks and well aerated before repacking in new sacks. Before dumping, the sacks should be well cleaned on the outside and the contents allowed to run out slowly, without shaking the sack. The dust adhering to the exterior of the sack and the floury fabric of the sack act as filters and adsorb considerable amounts of the gases. The resacked flour should be tested for arsenic and other poisons. Dr. Seidel actually suggests that in every case test bakes should be made and the bread fed to experimental animals, white mice. If the flour is no longer fit for human consumption it should be used for starch manufacture under Government bond. This is a very important aspect of the general problem of food supplies and defence, and the possibilities in this direction should not be overlooked. The safety of food stocks in the case of aerial gas attacks is second only to that of human beings.

Food and Health

The recent wave of enthusiasm for "nutrition" has brought forth the inevitable reaction. In our editorial comments last month we referred to Sir Robert McCarrison's speech on "Nutrition in Health and Disease" and expressed our own entire agreement with the view that "Food is the instrument of nourishment; nutrition is the act of using it". We also referred to the League of Nations' Report on Nutrition. We recognise, however, that there may be a danger of overdoing it all, and, as Shakespeare said, "With eager feeding food doth choke the feeder". Too much reiteration about nutrition may bring about mental nausea and do more harm than good and drive people's minds in the opposite direction. We read in a recent issue of the *Lancet* a letter on this subject by a doctor who somewhat sarcastically opened by saying of the "new science of nutrition" that he gathers that "what we eat, rather than where and how we live, what is our work, who were our parents, or what infections we encounter determines our stature, physique, immunity or liability to sickness, and even our mental outlook. I also gather that this is a new discovery, but whose, or on what evidence based, I am not told. Sometimes it almost seems that it had been revealed." The whole situation must be kept in proper perspective. We must try to secure that the entire population shall be ideally fed, but in our enthusiasm for this end let us not forget the importance of what a man does, where he does it and his inherited tendencies. A plant in the wrong environment dies the more quickly as a result of fertilising, and human health depends on environment and hereditary tendencies just as much as on a balanced diet. Since writing last month two more volumes of the League Committee Report have been issued, Volume II dealing with the Physiological Bases of Nutrition, covering energy, protein, fat, mineral and vitamin requirements, and Volume III with Nutrition in Various Countries. By comparison with the other two volumes the latter is a massive book of 271

pages. It contains much useful information for those who wish to study the problem in relation to the production and availability of foodstuffs in different parts of the world. The report is published by Allen & Unwin, and the prices of three volumes are respectively 2s., 6d., and 5s. 6d.

Milk and the Weather

Very few people are aware of the extent to which cows are affected by the weather. Not only is the total output of milk affected, but also the amount of milk fat is influenced. This was made very evident at the recent Royal Show at Bristol. The proceedings started in a downpour, and rainy conditions prevailed throughout the show. This had a marked effect on the milking trials and the butter tests, as the most severe storm occurred on the day when the cows were being milked. There was a much heavier list of disqualifications than usual, although some cows put up fine performances. This opens up one or two interesting speculations. Evidently animals react differently to weather conditions and some are influenced more than others, but in any case it shows that the milk producer is very much at the mercy of the elements. Sudden changes in weather and stormy conditions may well lead to the cow giving milk which is below the danger line in fat content. The unfortunate producer then becomes liable for prosecution for an offence caused by the weather and committed by the cow! The more we hear of milk production, distribution and marketing and the like, the more we feel that the milkman's "lot is not a happy one, happy one"!

The "Tinned" Food Bogey

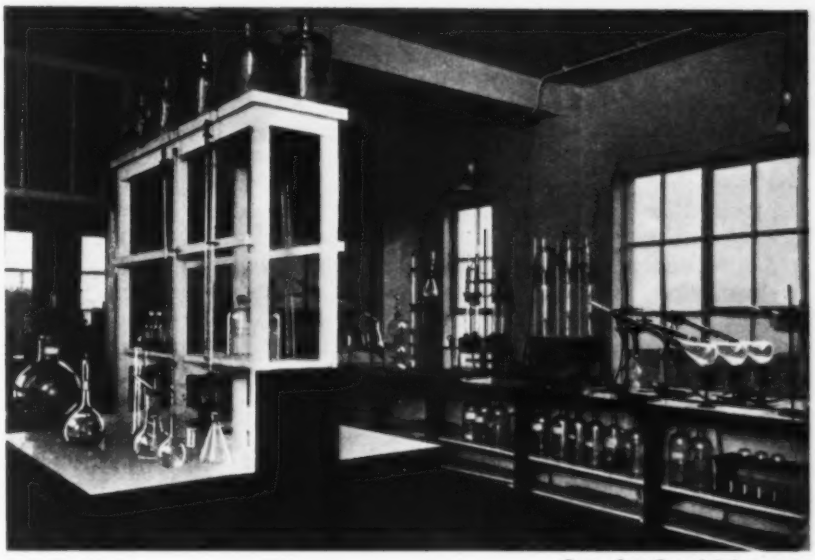
We have never really been sure whether this bogey is a purely British one or not. We have always been under the impression, rightly or wrongly, that the attitude of people in this country to canned goods is due to a combination of ineptitude with certain idiosyncrasies regarding food which are not so common in other peoples. But by a mere chance we have been made to wonder whether the people of other nations have not the same attitude as we have. On the other hand, we might ask whether the stigmatising of canned goods has now been recognised by people across the Channel as another affectation of the English people or yet another form of snobbery upon which they may usefully play. Before us is a small packet which contains medicinal charcoal made in Germany. The carton is printed in English, and on one side of it there is a description of the conditions of the body for which it is valuable. These include "troubles arising from . . . the after-effects of alcohol, *poisoning due to tainted food (fish, tinned foods, etc.)*"! Let us hope that makers of absorbents and correctives for irregular conditions in this country will not repeat the same inexcusable mistake of associating canned goods with tainted food and poisoning. However, our ruminations about Continental countries were set at rest when our Paris correspondent informed us lately that canning companies in France are very much annoyed about recent reports of "death due to food poisoning from canned goods". The case in point is that of three men who were found dead in their room. A can of tomatoes being discovered in the room, the doctor who was called in suggested that death was due to poisoning, and this news was widely published in the French Press. But the autopsy showed that death was due to carbon monoxide poisoning from a stove in the room and that the tomatoes were not in any way responsible. Although the canning firms' demands for a rectification were granted by the Press, they feel that the spreading of such information without due examination of the facts is highly injurious to the canning industry as a whole, and have asked legal advice on the possibilities of a prosecution of the persons involved in spreading the rumour. How much longer, may we ask, will it be before the canning industry audaciously proclaims the wholesomeness and nutritive value of all canned foods. We can think of no form of foodstuff that would derive greater benefit from a concerted advertising campaign than canned foods.

Gastronomique!

One of the annual affairs which always attracts a good deal of attention in Paris circles is the dinner of the Société d'Acclimation. The main interest of this dinner is the fact that the foods served are generally the most unusual that can be obtained, frequently being unattainable on the ordinary market at all. The menu of this year's dinner, which has just been held, included such items as Stewed Hippopotamus, Fillet of Antelope, Reindeers' Tongues, Japanese Algæ, Grilled Syrian Caterpillars, Mungo Peas and Leigoa Jam. Although some of the items, such as Grilled Caterpillars, find little favour, others, we understand, lead sometimes to the creation of a demand for exotic foods, and the dinner is always watched closely by importers who can find ideas as to what might be saleable.

ANALYTICAL METHODS applied to CEREAL PRODUCTS

By T. H. FAIRBROTHER, M.Sc., F.I.C.
Chief Chemist, McDougalls Ltd., London



Part of a Cereal Laboratory

This article has been written by special request in order to collect together in a reasonably short space the broad outlines of Modern Analytical Methods as applied to cereals with special reference to new methods. Of course, as one would expect, many methods employed are common to all branches of chemistry, and in these cases perhaps the interpretation of the results obtained is more interesting than the details of the test. It is in comparatively recent years that flour milling and bread making have joined the ranks of the exact sciences and that accurate methods have been employed to control the various processes practised empirically for centuries. Part I covers Moisture, Protein and Gluten, Gluten Determination, Gluten Components, Starch, Sugars and Diastatic Activities; Part II deals with Ash, Fibre and Cellulose, Pigments and tests occasioned by Bleaching, Fat, Gas Production, Brabender's Fermentograph, Baking Value and General Analyses.

PART I

IT WILL not be possible in an article such as this to enter into minute details and it is likely to be more indicative than complete. It is proposed to outline the general methods used in cereal chemistry, and to indicate any improved or new methods that have been developed in the last year or so. These will be considered under the following headings: (1) Moisture; (2) protein and gluten; (3) starch, sugar and diastatic activity; (4) ash; (5) fibre; (6) pigments and tests occasioned by bleaching; (7) fat; (8) gas production.

MOISTURE

Simple though it may appear, the determination of moisture in wheat and the various mill products is one of the most important of all, because it is on the moisture content that the miller adjusts his processes. As a control test absolute moisture is not necessary, and so long as various determinations in the same mill are comparable with each other that is sufficient. In most mills the method employed is the hot-air oven. Usually wheat, coarsely ground, is heated for a given time at a given temperature in a thermostatically controlled oven and the loss in weight is interpreted as moisture. The writer uses a Hearson oven at 130° C. for 2 hours, but the time and temperature vary in different laboratories. Recently A. Koster (*Z. ges. Getreide Mühlen u. Bakerew*, 1936, vol. 22, p. 35) has demonstrated that it is possible to approximate more closely to absolute moisture content by operating at 130° C. for 1 hour in a current of air than at 105° C. for 3 to 8 hours.

Recent developments in moisture testing have been concerned with a reduction in the time taken for the determination. A few years ago it was a common practice to put on a test overnight and thus learn to-morrow what to-day's moisture is! The use of the electric oven reduced the time considerably, but even at the best with the

ordinary oven a moisture test requires at least 2 hours. There has been a number of attempts to reduce this. In the Robinson "Ideal" moisture tester the balance is in conjunction with the oven. The sample is placed on a glass pan suspended in the heating chamber from one arm of a balance which is housed in an upper compartment. Hot air is circulated by an external fan. The actual moisture is read directly on a scale. Another type of oven, designed to obtain results in about 20 minutes, is the Carter Simon, which is really a flue through which hot air is drawn. Samples are weighed, heated, cooled and re-weighed, as in an ordinary oven. The apparatus is provided with flap doors at each end, and there is space for three containers in the oven. Samples are introduced at one end and each time a sample goes in one is automatically ejected at the other end. Each sample is in the oven for 15 minutes. The writer has obtained very close agreement between this oven and the Hearson at 130° C. for 2 hours. In America the vacuum oven is largely used, but the official method there is the Bidwell Sterling distillation method, where the moisture is distilled over with toluene and measured. Modifications of this method have been described in this country, where such substances as carbon tetrachloride and tetrachlorethane have replaced the toluene. Fairbrother and Wood (*Ind. Chem.*, 1930, p. 442) described a special apparatus in which carbon tetrachloride was used, and pointed out some of the limitations of the distillation method.

More recently Tate and Warren (*Analyst*, 1936, vol. 61, p. 367) have published work on the same subject, and have developed what is probably the most refined form of apparatus for the distillation method. They do not recommend aromatic hydrocarbons as distilling media and prefer the paraffins, of which they consider commercial heptane to be the most useful. Such determinations give rapid results, and the only objection is the time taken to clean and dry the apparatus between determinations. The latest development in moisture testing has been that depending on the dielectric constant. Of the several machines invented for this purpose the Heilan D.K. and the Burton Pitt apparatus are the best known.

The Burton Pitt method depends on the effect produced in a specially arranged radio circuit in which an alternating current of high frequency is generated. When the container holding the sample is introduced into the rapidly alternating field a change occurs in the strength of the current, and this may be read immediately as moisture content. In the Heilan D.K. the principle is that small variations in moisture content have a marked effect on the capacity of the condenser. This can be noted and expressed numerically by turning the knob of a variable condenser. The writer has used both of these, and while reasonably accurate results are obtained with flour the results on conditioned wheat vary within absurd limits. This is due to the fact that the moisture is concentrated in a surface layer and not distributed evenly throughout the berry. Brabender, by using a different principle, claims to have overcome this difficulty in his F.K. moisture tester. In this a damping method is employed instead of using either conductivity or dielectric constant principles, and it is claimed that the difficulty of surface moisture is obviated.

PROTEIN AND GLUTEN

Protein Content

The importance of protein content in relation to gluten quality is becoming more and more recognised. In America the protein content is one of the factors employed in the grading of wheat, but a chemical determination of protein from total nitrogen can be very misleading unless it is correlated with gluten quality. The procedure in most laboratories is to determine the total nitrogen by the Kjeldahl method. The chief variants in different laboratories are the catalyst used and the time and temperature. The writer uses copper sulphate as the catalyst and boils gently for 40 minutes in presence of anhydrous sodium sulphate. Much work has been done recently, especially in America, on the standardisation of this test, and in the latest edition of *Cereal Laboratory Methods* elaborate details are given as to size of flask, capacity of heating units, reagents, etc. In this official American method mercuric oxide is used as the catalyst, and potassium sulphate is employed instead of sodium sulphate. Beet (*Food Manufacture*, 1936, vol. 11, p. 89) has described a method whereby 1 grm. of material, 10 grm. of a catalyst (2 lb. K_2SO_4, 5 oz. $HgSO_4$, 1 oz. selenium) and 20 c.c. concentrated sulphuric acid are boiled briskly until the liquid becomes a pale lemon colour and then for a further "after boil" period. The ammonia formed is estimated by distillation and absorption in boric acid solution, which permits of direct titration.

Recent research has been devoted largely to the elimination of errors such as loss of nitrogen, etc., which are likely to occur unless great precautions are taken. Thus Miller (*Ind. Eng. Chem. Anal. Ed.*, 1936, vol. 8, p. 50) states that about 1·26 per cent. of the total nitrogen is lost in Kjeldahl determinations owing to incomplete absorption of ammonia at the beginning of the distillation. He has improved the usual procedure by using a delivery tube containing holes each 0·08 mm. in diameter, and claims that the loss of nitrogen is reduced thereby to only 0·06 per cent. Another line of research had been one to accelerate the process. Gerritz and St. John (*Ind. Eng. Chem. Anal. Ed.*, 1935, vol. 7, p. 380) have worked on this. 12 grm. of dipotassium phosphate trihydrate or 10 grm. of the anhydrous salt or an equivalent quantity of $P_2O_5 + KOH$ were substituted for five-eighths of the sodium or potassium sulphate used in the digestion. 2 grm. samples of feeds and wheat products were digested in 25 minutes or less over the bunsen flame and in 9 minutes on a preheated 700 watt electric plate. As would be expected, much research has been expended on the catalyst, and the search for the ideal one continues.

Lundin, Ellburg and Riehm (*Z. Anal. Chem.*, 1935, vol. 102, p. 161) describe a method whereby refractory substances, otherwise hard to decompose, are heated with a mixture of 3 parts sulphuric acid and 2 parts phosphoric acid. Copper, mercuric sulphate and hydrogen peroxide are added to facilitate the complete destruction of organic matter. Over 500,000 determinations of nitrogen have been made in Sweden by this method, and the authors have great faith in these catalysts. Osborn and Wilkie (*J. Assoc. Off. Agric. Chem.*, 1935, vol. 18, p. 604) have studied the effect of 39 metals on the ac-

curacy of the nitrogen determination on a gluten flour. They have found that mercury, selenium, tellurium, titanium, molybdenum, iron, copper, vanadium, tungsten and silver catalyse the reaction. The best catalysts are mercury, tellurium, titanium, iron and copper. If present in large amounts selenium, vanadium and permanganate interfere with the accuracy of the determination. These workers have established the fact that there is no material saving in time by using mixed catalysts. The writer has tried the effect of persulphates on the reaction, but obtained no noticeable advantage. Recent work has also been devoted to the titration of the ammonia. In the writer's laboratory the ammonia (obtained from 1 grm. of material) is distilled into 25 c.c. N/10 H_2SO_4, and if the rate of distillation is carefully controlled and adequate splash bulbs provided, this method gives very consistent results. Cochineal is used as an indicator, as the colour change is equally sharp in artificial light as in daylight. Other workers have varied the titration.

As already stated, Beet uses boric acid. Schirokoo and Volovinskaja (*Z. Unters. Lebensm.*, 1935, vol. 70, p. 240) treat the ammonium salt with standard aqueous silver nitrate and sodium carbonate. The precipitated silver carbonate is removed by filtration and the silver in the soluble $Ag(NH_3)_2$ complex is determined by titration with potassium thiocyanate in acid solution. This is a very laborious method which seems to offer no advantages and at the same time opens up the possibility of experimental errors. The writer has personally investigated many of these methods and has come to the conclusion that if standard conditions are maintained and reasonable precautions taken the use of copper sulphate as a catalyst, anhydrous sodium sulphate to raise the temperature and careful distillation into N/10 H_2SO_4 gives the most consistent and reliable results. It cannot be too strongly emphasised that this determination is one which demands rigid standardisation and care. It cannot be made foolproof, and a fool will contrive to upset any method however refined it may be.

Gluten Determination

There have been many methods suggested for this. The one employed in the writer's laboratory is as follows: 20 grm. flour is worked up to a ball of dough with water, usually about 10 c.c. of water is required, but this varies with the flour. The ball is then allowed to stand in water for 1 hour, after which the starch is washed away by careful manipulation in a very thin stream of water. In order to collect any particles of gluten that may break off, the washings are allowed to fall on to a piece of bolting silk (a No. 10 is suitable) placed over the top of a funnel. The washing is continued until no milkiness remains in the washings, indicating the complete absence of starch, but this in point of fact is difficult to attain. The writer has always been able to detect traces of starch in gluten no matter how it has been washed. The washing process has received much attention. Arpin in 1921 wrote a paper entitled *Standardising the Gluten Test*, which was really an account of the official French method. In it water of a fixed hardness is always used—100 mg. lime per litre, of which eight- to nine-tenths should be in the form of carbonate.

Possibly the most comprehensive study of the gluten washing problem was that made by Dill and Alsberg (*Cereal Chemistry*, vol. 1, p. 222), and although researches subsequent to this have been made the position is more or less the same to-day. Their main conclusions were that the effect of prolonging the washing period when tap water was used was a continuous decrease in the non-nitrogenous constituents of the gluten. Prolonged washing with boiled distilled water resulted in protein dispersion. The gluten obtained with tap water was of better quality than that from distilled water, but, of course, the composition of the particular tap water used has much to do with the result obtained. Dill and Alsberg concluded that gluten washing with approximately neutral 0·1 per cent. sodium phosphate is the best preventative against gluten dispersion. It must be clearly understood that gluten obtained by the washing process is not purely protein matter, it contains as well fats, lipoids, ash and some starch. The product obtained, however, if made under standard conditions, does give very valuable information about the quality of different flours. Unfortunately it is one of those determinations that demand a large amount of the personal equation. Machines have been devised for the mechanical washing out of gluten, but all these have their limitations, and so far the writer, while agreeing that the hand manipulation is crude and leaves much to be desired, is of the opinion that the most reliable information is obtained by this operation. The chief disadvantage is that while in individual laboratories comparative results can readily be obtained there is no standard comparison of results possible between different laboratories.

Gluten Components

Many laboratories of recent years have adopted methods for determining the components of gluten. The writer attempted this for a number of years, but has now given it up as a routine test for flour strength, but still feels that there is much academic interest in the glutenin-gliadin ratio in spite of the fact that the immediate practical value is rather obscure. Glutenin is usually estimated by the Blish-Sandstedt method (*J. Assoc. Off. Agric. Chem.*, vol. 9, p. 417, and *Cereal Laboratory Methods*, 1935, p. 35). The flour is first treated with dilute caustic soda and shaken at intervals for an hour, after which methyl alcohol is added with shaking. The liquor is allowed to stand and the starch settles to the bottom, when the clear liquid is decanted, through a well-packed cotton plug. The glutenin is precipitated from the filtrate by acidifying with N/20 HCl (using brom-thymol blue as indicator). The glutenin is allowed to settle for an hour and then centrifuged, when a compact disc of glutenin is obtained. This is separated and transferred to a Kjeldahl flask and the nitrogen content determined. This multiplied by 5·7 gives the glutenin content. Gliadin is taken as the protein soluble in 70 per cent. ethyl alcohol. The method is fully described in *Cereal Laboratory Methods*, 1935, p. 36.

In addition to glutenin and gliadin some laboratories estimate the proteins soluble in 5 per cent. potassium

sulphate solution and those peptised by neutral normal salt solutions. There have also been described a number of methods for determining the amino-acids in flour. Of these probably that of Søresnon (*Biochem. Zeit.*, 1907) is still more largely employed, although Foreman's method (described in Morrow's *Biochemical Laboratory Methods*, 1927) has also been used. As stated above, the writer has not been able so far to obtain enough reliable information from the isolation or estimation of the component parts of gluten to warrant making these routine tests. In 1929 (*Industrial Chemist*, October, 1929, p. 410) he referred to the method he then employed based on the work of Hoffman and Gortner (*Cereal Chemistry*, vol. 4, p. 222), but more recently he has come to the conclusion that these multi-determinations are more confusing than enlightening and, rightly or wrongly, relies for the evaluation of flour quality on the accurate chemical determination of nitrogen, a careful washing out of gluten and its subsequent examination taken in conjunction with a baking test. This may be regarded by many academic cereal chemists as retrograde or, at any rate, non-progressive, but it is a lamentable practical fact.

STARCH, SUGARS AND DIASTATIC ACTIVITY

Estimation of Starch

It is not often that starch is actually estimated, but there are occasions when it is necessary to determine the amount of starch. There are several methods, of which the direct acid hydrolysis is the simplest, although this is intended only for such materials as raw starch, potatoes, etc., and includes as starch the pentosans and other carbohydrates that undergo hydrolysis and are converted into reducing sugars on boiling with hydrochloric acid. A weighed quantity of the sample is stirred in a beaker with 50 c.c. cold water for 1 hour. It is transferred to a filter and washed with 250 c.c. cold water. The insoluble residue is heated for 2½ hours with 200 c.c. water and 20 c.c. HCl (s.g. 1·125) under a reflux condenser. The liquor is then cooled and nearly neutralised with NaOH, the volume made up to 250 c.c. and filtered. The dextrose is then determined on an aliquot portion of the solution in the usual way. Dextrose × 0·9 equals starch.

Another method is that of Rask (*J. Assoc. Off. Agric. Chem.*, 1928). In this the sample is extracted four times with each of the following solvents in the order named: ether, 70 per cent. alcohol, water. The residue is transferred to a beaker and cold hydrochloric acid is added and the whole worked to a smooth suspension. More acid is added, and the temperature should not exceed 22° C. After 5 minutes the whole is filtered through a Gooch crucible with a mat of asbestos. The filtrate is treated with alcohol and the starch is flocculated. After standing for 5 minutes the liquid is filtered through a weighed Gooch crucible. The crucible and its contents are dried at 130° C. and after cooling weighed.

Neumann, Roberts and Link (*Plant Physiol.*, 1935, vol. 10, 579) have described another method for determining plant starch. The plant material is extracted with benzene-ethyl alcohol (2 : 1) and the residue is boiled with 1 per cent. nitric acid in 85 per cent. ethyl alcohol. The filtered residue is washed free from acid with 20 per cent. ethyl alcohol. The extract is evaporated to small volume and the starch polysaccharides are precipitated by pouring into acetone-alcohol, separated by centrifuge, dried and weighed. For determining starch in the 20 per cent. alcohol extract the latter is evaporated to small bulk, boiled with HCl, and examined in the ordinary way for glucose. Sullivan (*J. Assoc. Off. Agric. Chem.*, 1935, vol. 18, 621) has described a procedure for the determination of starch in plants based on the extraction of the starch with slightly alkaline calcium chloride solution and its precipitation with iodine. The difficulties involved in precipitating starch iodide in the presence of calcium chloride are avoided by removing the $CaCl_2$ and substituting ammonium sulphate as the flocculating agent. It is stated that the quantities of starch obtained by this method represent the true starch values more closely than those obtained by enzymatic methods.

A similar method has recently been described by Pucher and Vickery (*Ind. Eng. Chem. News Ed.*, 1936, vol. 8, p. 92). The starch is extracted from plant tissues either by hot concentrated calcium chloride or by cold 21 per cent. HCl, and is precipitated from the extract by iodine at the correct acidity and salt concentration. The starch iodine is decomposed with alcoholic alkali and the starch isolated and reconverted by dilute acetic acid into the colloidal iodine form. The light transmission is determined in a Pulfrich spectophotometer and the amount of starch calculated from a calibration curve constructed from observations on pure potato starch.

Determination of Reducing Sugar

There are two methods available with Fehling's solution, the volumetric and the gravimetric. In the latter the cuprous oxide is filtered, washed and weighed on a Gooch crucible. This is probably the more accurate, as in the volumetric determination, even using the methylene blue modification of Lane and Eynon (*J. Soc. Chem. Ind.*, vol. 42, p. 32 T), it is not easy to get the correct end point, and in the writer's laboratory it was not possible to get entirely concordant results among different workers. The finely divided red precipitate which is formed makes a sharp end point almost impossible. The time and rate of boiling during the titration are also causes of variation, and although the gravimetric method takes longer it is more reliable. The method recommended by the writer is a modification of the one suggested by Quisumbing and Thomas (*J. Am. Chem. Soc.*, vol. 43, p. 1503) and Sherwood and Bailey (*Cereal Chemistry*, vol. 3, p. 107). The alkaline tartrate solution contains 65 grm. NaOH and 175 grm. Rochelle salt per 500 c.c. The copper solution contains 41·2 grm. $CuSO_45H_2O$ per 500 c.c. The clarified extract is carefully neutralised with caustic soda and 25 c.c. each of the Fehling's solutions are added to an amount which represents 2·5 grm. flour. It is heated at 80° C. for ½ hour and then filtered through a weighed Gooch with an asbestos mat. After washing with water, alcohol and ether the Cu_2O is dried and weighed.

(*Continued on page* 317.)

A New Type of BREAD FACTORY with CENTRAL HEATING

An account of new bread-making plants now being built in many parts of Russia, by V. V. NASHTSHOKIN, specially summarised on behalf of FOOD MANUFACTURE by E. B. BENNION, M.Sc.Tech., A.I.C. The diagrams accompanying the description, though relatively indistinct, serve to illustrate the essential features of the design and arrangement of a typical plant.—ED.

IN THESE new plants now being developed in U.S.S.R. the production flow is arranged in circular form. The plan (Fig. 1) shows the layout of the building on the site. The main production building consists of a circular building with a diameter of approximately 100 feet. In one portion there are seven floors and in the other section five floors. The flour store occupies the first two floors of one building, whilst in the other building the dining room and rest room occupy similar floor space. The flour is brought by rail to the bakery, whilst dispatch of bread is carried out on the opposite side (iii on the plan). In the centre (iv) there is the boiler room which supplies heat for the ovens. Fig. 2 represents the production layout for the factory. The doughs are mixed on the top floor, they pass on to the next floor to the dividers and provers, and then to the floor below to the ovens. The floor below is for dispatch. The flour is stored in the basement and ground floor.

There are three complete plants in each building. The plants consist of similar equipment to that used in all modern factories. The layout, however, is unique.

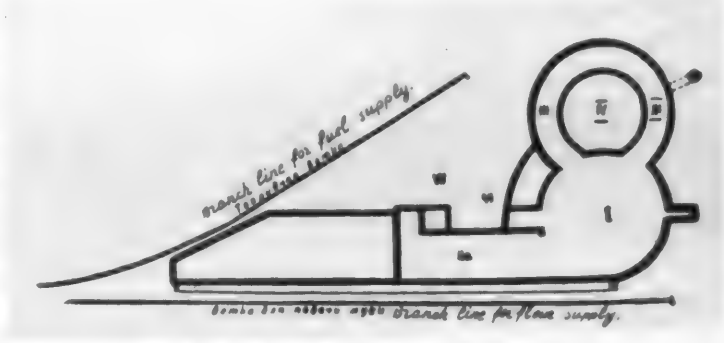
The flour is elevated by bucket elevators to the fermentation department, which is situated on the top floor. This is where a type of sponge is made, and the room contains a circular unit of twenty mixing pans and one dough mixer on a rigid circular conveyor. It designed for the supply of 122 tons of rye bread per day.

The dough-mixing department has three rigid conveyors. The large circle has forty-six mixing pans and three dough mixers; on the small circle there are eighteen mixing pans and three dough mixers. To each circle there are installed two dough dividers and moulders for handing up the dough. Below each divider there is built an intermediate prover in circular formation.

The sponge and dough system is worked and everything is so adjusted that the whole process is automatic.

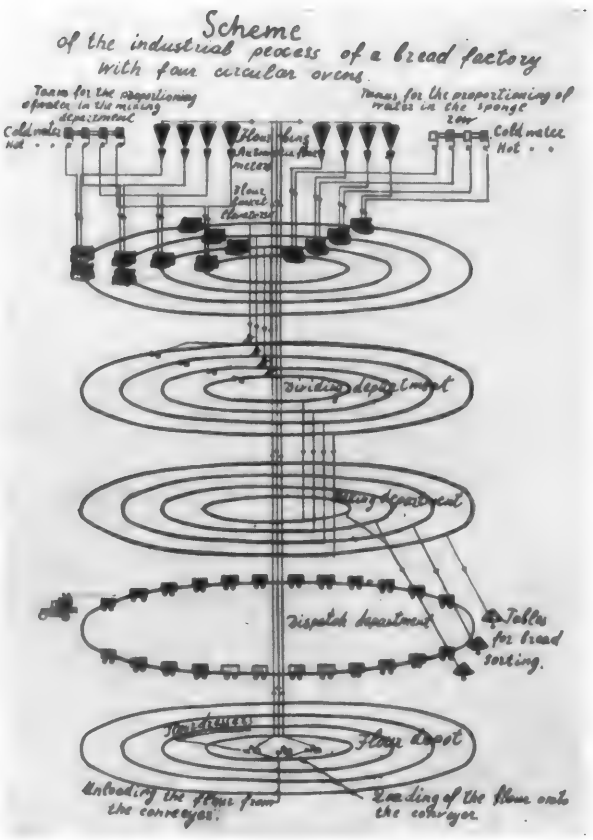
First of all the ingredients for the sponge are weighed down into the fermentation pan. This pan passes to a mixer where the sponge is made. The pan then moves round the circle and at the correct point after the correct length of time the remainder of the ingredients are added. Mixing then takes place and the pan travels on. Other pans follow on so that continuity is maintained. The speed at which the pan now travels is controlled, so that when it reaches the divider it is "ripe". Here the pan is attached to a lifting device so that it is tilted into the divider hopper, and in this way a regular feed is ensured. The empty fermentation pan now passes on, when it is cleaned out ready for use again.

After the dough passes through the divider and the intermediate prover it is automatically ejected and goes to the moulder, where it is shaped. The point at which the bread enters the circular oven can be controlled as desired. As there are three circular bands of different heats, they can be used as means of giving the correct proof to the bread. The moulding machines are not fixed, but can be moved about according to the portion of the oven which is in use.

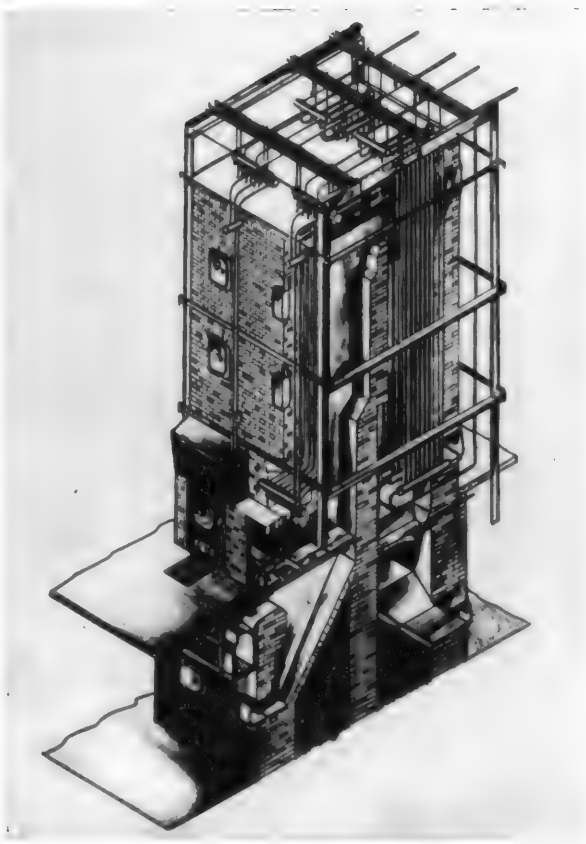


Plan of the layout of a circular bread factory.

The large oven is designed for a capacity of 135 tons of wheat bread per day (24 hours) and 122 tons of


Scheme
of the industrial process of a bread factory
with four circular ovens.
Dispatch department
Tables for bread sorting.
Flour depot
Unloading the flour from the conveyor.
Loading of the flour onto the conveyor.

A diagram showing the production process of a circular bread factory.



The high pressure boiler used.

rye bread. The middle oven has a capacity of 104 tons wheat bread and the small oven 48 tons of wheat bread per 24 hours. The average weight of all the loaves is about 2 lb. When the bread is baked it is taken from the oven and transferred to circular bread-cooling racks.

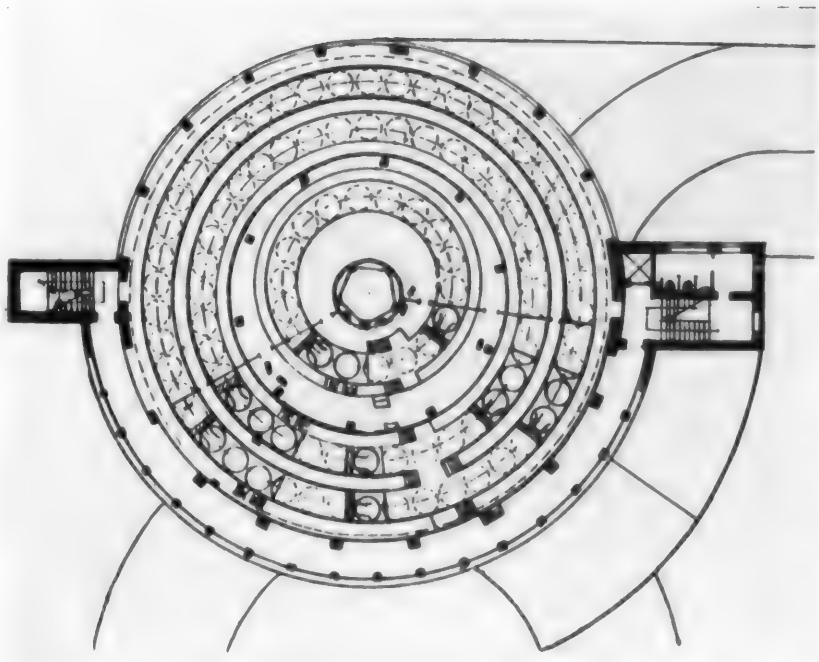
Heating of Ovens

The boiler room is situated in the centre of the building; the access to it, fuel handling and ash removal are accomplished by means of tunnels under the dispatch department. Each oven unit consists of two parts—the vertical water tube drainless high-pressure boiler and the baking chamber. The unit works in a closed circle without the addition of feed water. The saturated steam passes from the boiler through the steam piping into the heating elements of the baking chamber. There the heat of vaporisation is transmitted and the steam returns through the steam piping back into the boiler in the form of condensate. The required boiler pressure is determined by the conditions of baking. The baking temperature is from 230° to 270° C. This requires a steam temperature in the heating elements of the order of 280° to 300° C., corresponding to a steam pressure of about 90 atmospheres. Each oven is served by a separate boiler. The boilers consist of a different quantity of banks of tubes. Each bank consists of twenty-two boiler tubes, diameter 32/20 mm., the ends of which are welded to the boiler head, which has a 100/60 mm. diameter. Generally each boiler is sub-divided into several groups, each group working independently. The only control instruments on the boiler are manometers.

All the boilers are equipped with cold blast furnace of the semi-shaft type with inclined stepped grates, designed for the burning of Moscow basin coal. Coal handling and ash removal are performed by means of a rigid circular conveyor. Economisers are fitted to supply hot water for the factory. The ovens are constructed of iron with suitable insulating material—diatomaceous earth. They are driven by the same motor as the proofing circles.

One of the greatest drawbacks found out in the original plants was the loss incurred by any failure of the oven, since all the bread was spoilt when any boiler explosion occurred. Modifications of these have now been made so that no oven is solely dependent on one set of boilers. The ovens are now divided into four sections, each section being served by two boilers.

In the paper under review the whole question of the



A plan of the Dough Mixing Department in a circular bread factory.

thermo-dynamics of high-pressure steam heating for ovens is considered, and it shows the thoroughness of the research work which is being carried out in Russia to-day. A conclusion arrived at is of interest and is as follows: "At the present moment the designing of baking ovens in America as well as in Europe is mostly founded on technical intuition. This may be explained by the fact that the dynamics of gas flow in flues and the baking chamber have not as yet been studied enough. One cannot use the formulæ adopted in boiler practice for the calculation of the process of heat transmission in ovens."

We may yet see our universities devoting some attention to the thermo-dynamics of the baker's oven, and the sooner this is done the better for the trade.

ANALYTICAL METHODS applied to CEREAL PRODUCTS

(*Continued from page* 314.)

Williamson and Davison (*J. Agr. Research*, vol. 28, p. 479) suggested a colorimetric method, which was also adopted by Blish, Sandstedt and Platenius (*Cereal Chemistry*, vol. 6, p. 122). It depends on the reduction of a solution of picric acid to the red picramic acid. The writer has, however, tried this method on a number of occasions and obtained consistently low results compared with the copper reduction method. Vercillo (*Annali. Chim. Appl.*, 1935, vol. 25, p. 379) extracts the flour with basic lead acetate solution, removes the lead and then determines reducing sugar. Dough or bread can be extracted with potassium ferricyanide, and after adding zinc acetate the liquid is filtered and the sugars determined. This method has the advantage of providing for the inhibition of any diastase action during extraction which would consume some of the sugar present. This, of course, is the chief objection to methods dependent on aqueous extraction. Schaffer and Williams (*J. Bio. Chem.*, 1935, vol. 111, p. 707) determine reducing sugars by the ferri-ferrocyanide electrode. The results are unaffected by *p*H change, by the products of sugar oxidation or by changes in the volume of solution about the electrode. Hassid (*Ind. Eng. Chem. Anal. Ed.*, 1936, vol. 8, p. 138) gives details for the clarification of extracted plant materials and for reducing sugar. The reducing sugars are oxidised with potassium ferricyanide, and the ferrocyanide produced is titrated with ceric sulphate, using orthophenanthroline as indicator.

Diastatic Activity

The method used in most laboratories is based on the work of Rumsey (*Am. Inst. Baking Bul.*, 8). 10 grm. flour are introduced into a 200 c.c. Kohlrausch flask and brought to 27° C., and 100 c.c. of water at 27° C. are added. The flour is brought into suspension by rotating the flask, which is loosely stoppered and placed in a thermostat for 60 minutes with gentle shaking every 15 minutes. At the end of the digestion period the suspension is diluted to about 175 c.c. and clarified by adding 3 c.c. 15 per cent. sodium tungstate, acidified with H_2SO_4. This inhibits enzyme action immediately and precipitates the protein. The liquor is diluted to 200 c.c. and centrifuged, and a 50 c.c. portion of the clear supernatant liquid is removed for the determination of reducing sugar. A blank is carried out in exactly the same way except that the acidified tungstate is added immediately to stop enzyme action. The difference between the reducing sugar found in the two cases is the index of diastatic action in the flour. This is sometimes known as the maltose figure and has considerable significance.

(*To be continued.*)

Progress and Development in the

BAKERY TRADE

In this article Mr. E. B. Bennion reviews the progress and technical developments which have taken place in the bakery trade during the past twelve months and reflects upon the possible future developments.—Ed.

E. B. Bennion, M.Sc.Tech., A.I.C.

Head of the National Bakery School

WITH THE arrival of the International Exhibition for the Bakery and Confectionery Trades each September, it seems a very opportune time to review the progress and technical development in the trades during the past year and at the same time reflect upon possible developments in the future.

Economically the past year has been a most difficult one because of the rising prices of raw materials. The increases could not be handed on to the consumer, in many cases because of the keen competition which has existed. As a result of this situation, however, there has been a greater striving for improved methods of production so as to try and overcome the effects of the higher costs of raw materials by a reduction of other production costs.

Breadmaking

With the launching of the bread advertising campaign there has been a constant endeavour to produce better bread. There have been two distinct camps in this campaign. Firstly, there have been, and are, those who have marketed an improved product and by the use of enriching agents and high-grade flours have produced a loaf of bread for which a higher price has been obtained. There have been those in the other camp who have been compelled to follow the practice of improving their existing type of bread which has to be retailed at a standard price. This has necessitated adopting methods and using improvers which would not increase production costs to any appreciable extent.

The task of those who have secured the higher price necessary for better bread has been comparatively easy. If an extra halfpenny per loaf can be secured a good deal of improvement in quality from appearance, eating qualities and nutrition can be obtained in a loaf. The generous use of fat, milk, malt and sugar can be effected, whilst top-grade flours could also be used. The result should be a very palatable, nutritious loaf.

There have been many improvers marketed during the year, the basis of several being the use of emulsified fats, a small quantity of which radically affects the physical characteristics of the loaf. Lecithin emulsions have made great progress and many plant bakeries are now using this product. The influence of lecithin is to modify the gluten in order that the plasticity and elasticity of the dough is increased so that it possesses good handling properties. As a result of its use doughs which pass through automatic plants come from them in better condition and a softer, moister crumb is obtained in the bread. Improved flavour is also claimed.

New Flour Testing Methods

Considerable interest has been shown in the Brabender Farinograph and Fermentograph, and several large bakeries have installed these machines. By the recordable data obtained from these machines a very sound method of control of flour quality is available to the baker. Not only can the deliveries of flour be controlled with greater accuracy but much more control can be given in the blending and buying of flours. Many firms have found that, buying flour on sample with the use of this machine, they could effect considerable financial saving, since the dough characteristics can be compared and the comparative values of the flours from bread-making qualities obtained in this way. A party of bakers visited the Brabender Laboratories in Duisberg for one of their courses and returned full of enthusiasm for the work which is being carried out there.

Machinery Developments

In the realms of bread-making plant the most marked development has been the dough-tilting plant to provide an automatic feed to the dividers. The mix pans from the Baker Perkins Viennara mixer can be placed on an automatically controlled platform which tilts. In this way the dough is shot into a large hopper, from which by gravity it passes to the divider on the floor below.

Many modern bakeries have been opened during the year in which most of the plant is of the fully automatic type. We understand that in most of these minor improvements have been effected, all of which increase the efficiency and ease of work. Considerable improvement continues to be made in oil burners, resulting in much more economical working and the rendering of them almost silent. The development of electric ovens takes place slowly, apparently because of the attitude of some

of the electric supply companies in not granting sufficiently cheap rates. When the grid system came into operation most people expected much cheaper industrial rates, but these have not always been forthcoming. Instead, many people have been faced with higher charges. Those who have been pioneers in industrial electrical development work in the bakery trade do not find themselves now in such a favourable position as they had hoped to be. The gas companies have been expending much money on research and the gas firing of ovens is making very rapid progress. All types of ovens can now be efficiently fired—including side flue—and running costs are becoming much lower. It looks as though the electrical companies will have to wake up, otherwise they will find some of their ground being cut from under their feet.

Research and New Methods of Breadmaking

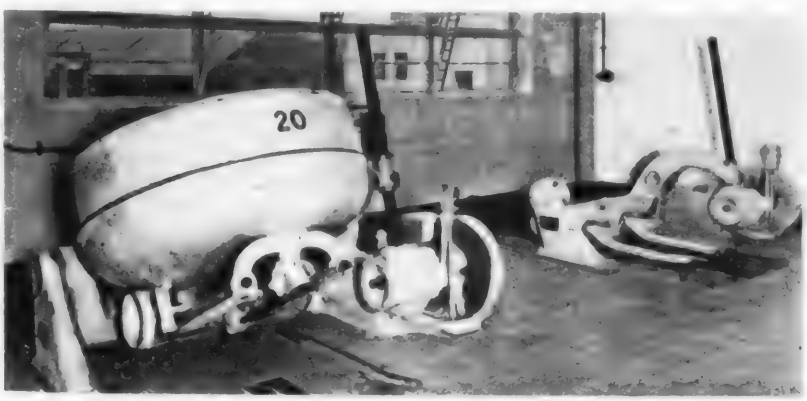
A new method of bread making was published in *Cereal Chemistry*, vol. xiii., No. 2, by L. H. Bailey and T. A. LeClerc. This was a comparative study of bread leavened by yeast and by hydrogen peroxide. For their experiments 100 vol. (30 per cent.) hydrogen peroxide was used. In using this, one-seventh of the liquor was replaced by hydrogen peroxide. When the dough was treated in the ordinary way very poor volumed bread resulted. When, however, the dough was left for from 12 to 16 hours the peroxide gradually decomposed and the bread produced had the texture, grain and volume of ordinary bread. From photographs shown these claims seem justified. The flavour, however, is inferior, and analysis revealed that the peroxide bread contained a greater amount of sugar than yeast-raised bread, since none was fermented away. The amount of soluble starch is higher in yeast-raised bread, however, particularly in the crust, and this contributed to the vastly superior flavour. It does not look as though this process will have any commercial appeal.

A. G. Simpson, in the same volume, deals with the Mechanism of Gas Production in Dough Fermentation, and deals with an aspect of bread making which is interesting many people at present. In this paper the author deals with the comparative rates of fermentation in sugar solutions and in sugar-starch doughs. From the experiments it is shown that the rate of fermentation in a dough, as judged by gas production, increases rapidly for a time and falls at a steady rate, whereas in a sugar solution it falls at a constant rate all the time. Further, the rate of fermentation for the same amount of yeast is greater in the use of doughs than in sugar solutions. Here data is given of the influence of varying quantities of yeast or gas production, whilst the question of yeast reproduction is also considered. It is a valuable contribution to the literature of a branch of bread making extremely devoid of any scientific data. Researches have also been carried out on the mechanical and physical conditioning of doughs as a means of shortening fermentation processes. Along such lines the development of bread making processes seem to lie.

Flour Confectionery Plant

In cake making the success of the process depends on a complete blending of the materials. In the production of the cheaper varieties a considerable proportion of milk has to be used to replace egg as a moistening agent. This must be incorporated in the mixing so that a perfect emulsion is obtained. A new combination of machines has now been built into a unit for this purpose. A Morton High-Pressure Sponge Whisk, normally used in the manufacture of sponge cakes, is used in conjunction with a Baker Cake Machine and an emulsifier. The eggs, with a proportion of sugar, obtain their maximum aeration in the high-pressure whisk; the fat, with a proportion of flour, obtains its maximum creaming in the Baker Cake Mixer; the milk, oil, sugar and other soluble ingredients are dissolved and emulsified in the emulsifier, and finally these are all blended with the remainder of the flour and other dry ingredients in the cake machine, mixing being carried on for a definite time automatically controlled. In this way high quality cake is produced of an amazing regularity. The ordinary cake machine with the special air-pressure attachment has found a good reception, whilst special cream-whisking machines have found a ready sale in those concerns using large amounts of whipped cream. The increased volume obtained soon pays for the machine by producing a lighter product with good keeping qualities. We understand that very soon an automatic penny sponge-making plant will be available, the first of its kind in the world. This will certainly be a most interesting unit.

(*Continued on page* 324.)



A Baker Perkins Viennara Mixer which can be placed on an automatically controlled platform which tilts, allowing the dough to be shot into a large hopper from which it passes to the divider on the floor below.

TOFFEE & CARAMEL

By D. W. Grover, B.Sc., A.I.C.

THE IMPORTANT raw materials of toffee manufacture are sugar, syrups, confectioners' glucose, condensed milk and fats (including butter). All of these are of recognised nutritive value and, although something is no doubt lost in cooking, toffee or caramel made from them will clearly compare well with other sweetmeats from the point of view of nutrition.

The following paragraphs will deal briefly with the qualities to be looked for in these raw materials.

In the second part of this article, which was commenced in the August number, the author deals with the important raw materials for toffee manufacture, including sugar, syrups, confectioners' glucose, condensed milk and fats. He also describes the manufacture of toffee and caramel and the packing of the finished product.

Sugar

Many grades of sugar are used in toffee and it is impossible to lay down analytical figures to which they should conform. When a particular grade has been chosen for a certain recipe, however, it is important that variations in analysis, taste, consistency, etc., should occur only within defined limits. For convenience of buying, these limits should not be unnecessarily close. For instance, a certain variation in the colour of the sugar may have little or no effect on the colour of the toffee made from it. Such a variation should be ignored. A modification of the candy test, in which the sugar is boiled to 270° F. under standard conditions, provides a useful guide as to the behaviour of the sugar on boiling.

Sulphur dioxide is often present in raw sugars. The amount should not be such as would entail any risk of infringing the Preservative Regulations. Raw sugars are also liable to be infected with yeasts; sometimes to quite a considerable extent. There do not appear to be any ill-effects from such infection provided that it has not progressed too far.

Insoluble material in sugar can be a serious nuisance, particularly when it is of a gritty nature. A possible source is the scale from evaporators. When testing for insoluble matter a large sample, about 4 lb., should be dissolved in warm water.

Sugar is stored in its original sacks and transferred to wooden or galvanised iron bins for distribution. Both types have disadvantages. Wood splinters and necessitates the use of screws, etc., which are a continual danger, while galvanised iron rusts.

Syrups

The quantity of syrups used in toffee is insignificant compared with the quantity of sugar so used. Their value lies in their flavour, and quality should be assessed with this in view. Water content, colour and behaviour on boiling are the most useful laboratory tests. Raw molasses often contain an assortment of solid matter, amongst which pieces of sugar cane feature prominently, and should be strained before use. Refined syrups and treacles should be free from insoluble matter. Crystallisation often occurs when syrups are stored for any length of time. This does not affect their value unless accompanied by fermentation.

Confectioners' Glucose

Of the three carbohydrates which compose confectioners' glucose (corn syrup), dextrin is mainly responsible for its valuable properties. A glucose with a high dextrin content is therefore to be preferred. The quantities of maltose and dextrose are less important. Sulphur dioxide is nearly always present in glucose. The amount should be considered in relation to colour and flavour (see sections dealing with these properties). The legal limit of 1,000 parts per million is seldom exceeded.

The colour of glucose, like that of sugar, should be considered in relation to the colour of the finished product. A white glucose might quite possibly become more discoloured on boiling than a slightly less bright one. This can, of course, be ascertained by a trial boiling in the laboratory. Simultaneously the degree of inversion brought about by boiling with sugar (sucrose) can be determined.

Glucose is delivered to the factory in barrels, drums or from tank lorries. The last procedure has distinct advantages provided correct storage is provided in the factory. The warm glucose as delivered in bulk is easy to handle in the factory and there is no loss due to incompletely emptied containers. The temperature of delivery is in the neighbourhood of 120° F., and can usually be varied to suit the customer's convenience. The factory storage tank should be lagged and, if possible, the application of heat to the glucose avoided. Heating pipes, especially if operated by steam, cause local overheating and eventually charring. A coating of burnt dextrin, etc., forms on the pipes and is liable to flake off and contaminate the toffee. Storage, even at comparatively low temperatures, causes a gradual darkening of glucose, more pronounced as the sulphur dioxide content is less. This discoloration is usually unimportant in relation to the colour of the toffee.

Condensed Milk

By far the most usual form in which milk is incorporated in toffee and caramel is condensed milk, either full cream or machine skimmed. Deliveries should have normal figures for sucrose, lactose, casein, fat and water. The acidity expressed as lactic acid should not exceed 0·45 per cent.

The physical condition of condensed milk is usually considered important, but there is no agreement as to what is the best milk for toffee manufacture. Some sugar boilers prefer a viscous milk, some a thin one. The difference in viscosity is connected with the degree of denaturation of the casein and varies with age. Lactose crystals impart the characteristic slight roughness to condensed milk and, according as the crystals are larger or smaller, the milk is rough or smooth to the palate. However, the lactose crystals dissolve on boiling and their size is not important.

Bulk storage of condensed milk requires regular consumption and correctly designed storage tanks; the latter requiring so much attention that usually delivery in barrels or drums is to be preferred. The dissolved solids in condensed milk, particularly full cream, are insufficient to prevent the development of yeasts and acid-forming organisms. These quickly cause partial coagulation and render the milk useless for toffee production. The small clots formed scorch easily during cooking and remain as spots in the toffee. Similarly the crust which forms on condensed milk exposed to the air contains particles of coagulated casein which scorch when cooked. All receptacles for condensed milk should be clean and as nearly sterile as possible. Large stocks should be avoided and the barrels or drums opened for examination only shortly before use. If the seal is broken unduly early there is a greater chance of the development of yeasts and bacteria.

Fats

Of the fats other than butter which are used in toffee, those derived from coconut, palm kernel and ground nut oils are the most popular. The first two are used in the deodorised form while the last is invariably hardened. Hardened coconut and palm kernel oils also form the basis of many "toffee butters" which are widely used.

The best melting point for a toffee fat is not agreed upon. There is an upper limit set by the necessity for the fat to be liquid at blood temperature (98° F.). Some writers have expressed a preference for fats with a melting point similar to that of butter fat. This would include refined coconut and palm kernel oils (melting points about 76° F.). On the other hand, the general practice is to use fats with a higher melting point of about 95° F. in the best quality caramel and toffee. The contention is that better "body" is conferred thereby. This contention is no doubt influenced by what is at first sight an obvious relation between the hardness of the fat and the "body" of the toffee made from it. This relation is less obvious when the toffee is considered as an emulsion, with the fat as the disperse phase.

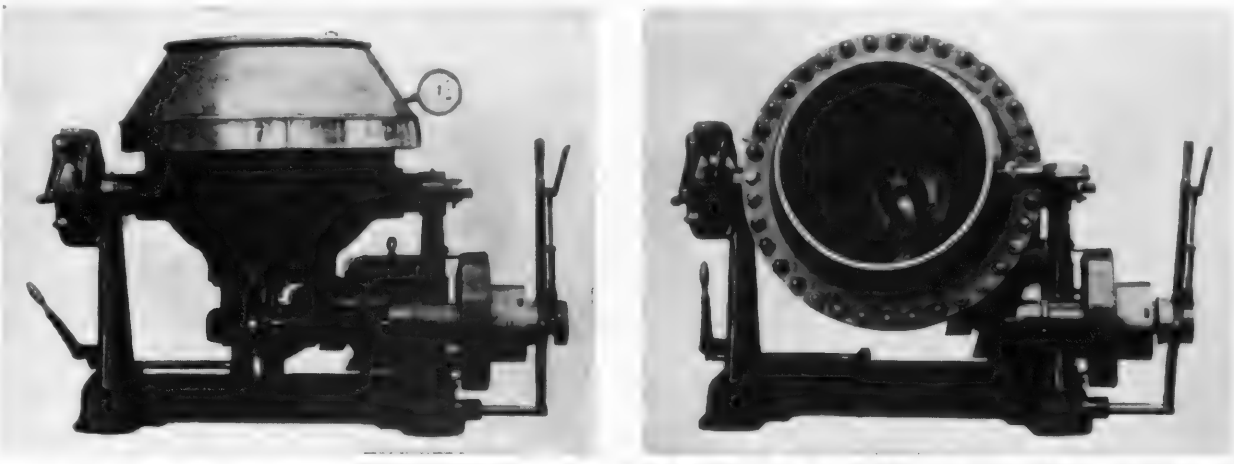
Fats are conveniently melted before distribution. Galvanised iron tanks heated by low pressure steam are suitable for the purpose. It is important not to heat refined fats in contact with the air. To do so encourages subsequent development of rancidity. For this reason molten fats should be kept as little above their melting points as possible. Copper receptacles should be avoided as this metal catalyses the development of rancidity.

Butter

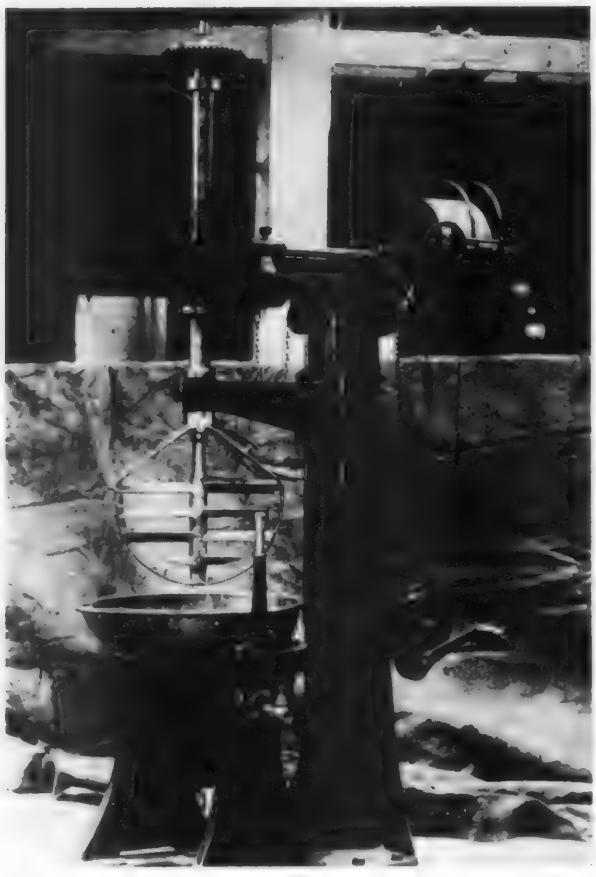
Butter is added as a flavouring material and should be evaluated with this in view. Strongly flavoured butters are better than mild, and, while fishy and tallowy taints are objectionable, a distinctly rancid flavour in the butter is no disadvantage. In warm weather, butter should be kept in cold storage.

Manufacture

The manufacture of toffee and caramel can be divided into four stages:



Two views of the Hansella Vertical Mixing and Boiling Pan used in toffee and caramel manufacture. (With acknowledgments to Baker Perkins, Ltd.)



A Toffee Pan fitted with beating arms and scrapers. (With acknowledgments to the Morton Machine Co.)

Preparation of the raw materials.
Cooking to the desired consistency.
Cooling and cutting into shapes.
Packing.

Some manufacturers use large mixing machines for preparing their raw materials. The chief function of these is to bring about emulsification of the fat. One advantage of this practice is that the pans are relieved of the duty of emulsification and less "pan-time" is required for each boil. Another is that the preparation of large batches of raw material minimises the possibility of variations due to inaccurate weighing, etc.

Such a mixer can consist of a horizontal cylindrical vessel, inside which rotate a number of arms fixed along the length of a horizontal axis. Baffles are fixed to break the flow. For loading there is a lid in the top, and for unloading a large diameter hole in the bottom fitted with a closing plate. The capacity can be anything up to 15 cwt. If mixers such as the above are not used, the raw materials are prepared in the boiling pan prior to cooking.

There are two types of boiling pan. One, until recently the only type in use, is fitted with a double acting mixing gear. The essential features of this are an anchor-shaped member conforming to the shape of the pan, fitted with scrapers; and a number of beating arms. By suitable gearing the anchor-shaped member is made to revolve in one direction and the beaters in the opposite direction. Such a pan is illustrated on this page. The whole mixing gear is raised or lowered as desired, enabling the pan to be tipped up for emptying. The speed of the mixing blades and scrapers is usually from 50 to 100 r.p.m., the advantage from the point of view of the product being with the faster speed.

The second type abandons the double action described above and relies on a single member rotating at high speed with a very small clearance from the walls of the pan. One such pan is illustrated. The drive is from below, thus eliminating the lifting gear (illustration on page 321). Toffee pans are made of copper and the mixing arms of brass.

The steam pressure required for toffee boiling is upwards of 90 lb. per sq. in. Rapid boiling is advantageous, and for this a high steam velocity is required in the early stages of cooking, when evaporation is considerable. Later, when the temperature has risen to the neighbourhood of 265° F. the actual pressure of steam is more important. For butterscotch and other boiled goods higher pressures are necessary.

As regards the actual cooking of the toffee it is not possible to go into detail here. Each sugar boiler has ideas as to the best order and manner in which the various operations should be performed. These are his trade secrets. All processes are made up of three operations: making the emulsion, dissolving the sugar and removing sufficient water by evaporation. The preparation of the emulsion can occur in the pan or in the pre-mixer, and consists of beating together the fat and the condensed milk, alone or together with other ingredients. Sugar is dissolved by gentle boiling, and the water removed by boiling as fast as possible until the batch is cooked. This point is determined by withdrawing a portion of the mass with a knife or wire and immersing it in cold water. If the "crack" is correct, the batch is cooked. It is then rapidly removed from the pan and pitched on to cooling tables in preparation for cutting.

Before following the further progress of the toffee, it will be of interest to consider the method of testing boils by the "crack", for here the human element is liable to cause variation in the product. If the sugar boiler could give his whole attention to one boil he could follow the gradual appearance of "crack" and "body" in the toffee and give a very good decision as to when the batch is finished. Usually, however, he has to attend to several pans, with consequent risk of variation. One point which can be assured is that the water in the testing pail is kept at constant temperature. If it is allowed to get warm there is a natural tendency to cook the toffee correspondingly harder. Pans with the single type of mixing gear (illustration on page 321) allow the use of a thermometer.

The toffee from the pans is cooled by pitching on to rectangular (usually 3 ft. by 6 ft.) cast iron tables through which cold water can be circulated. Its treatment on the tables varies according to the method of cutting to be adopted. In many cases the toffee has to be formed into sheets of uniform thickness prior to cutting into shapes. These sheets can be made by passing plastic toffee through rollers or by "levelling" the still liquid toffee on the

tables. The latter process has advantages and will be described first. Several cooling tables are arranged to make a run of, say, 36 ft. and bars are fixed along the edges to prevent the toffee from running off. The toffee is pitched and while it is still liquid a horizontal levelling blade is run over it, leaving it spread over the whole surface of the tables as a uniform layer. If it is to be made into slab toffee, steel frames are forced into the cooling mass and removed when the toffee has set. This procedure scores the surface, enabling the slabs to be separated and making the well-known markings on the slab itself. There are other ways of making slab toffee but that described is the most popular.

For making toffee pieces for wrapping or chocolate coating, the layer of toffee on the tables is allowed to cool somewhat and then cut in a press or by rotary knives. Pieces of about 1 ft. 6 ins. square are divided off and fed to the cutting machines, whose action requires little explanation. In the press a frame of knives is brought down on top of the toffee and then withdrawn, leaving it cut into squares, oblongs, etc., as required. The rotary cutter is best illustrated by the "four-way cutter". The toffee is placed on a metal plate which is carried round the four sides of the square. On two of these sides are sets of rotating knives which cut the square of toffee first in one direction and then at right angles, again producing small squares or oblongs as required. The pieces of toffee so produced must be wrapped or coated immediately; otherwise they will absorb moisture, become sticky and grain prematurely.

The toffee can be brought to the correct thickness by the use of rollers. The machine used is called a "break". The toffee is poured on to the tables, not levelled, but allowed to cool until plastic; then passed through the "break" and treated exactly as described for levelled toffee.

The "plastic" treatment of toffee differs considerably from those described above. The batch is pitched as usual on the cooling table, spread out and allowed to cool to a plastic condition. It is then rolled into a cylinder, which is pulled out to form a rope of about 1 in. diameter. This rope is fed to a "plastic cut and wrap" machine, which forms the rope of toffee to give it the correct cross-section, cuts it into pieces and wraps the pieces in waxed paper. These wrapped pieces, after a period of cooling, are ready to pack. Frequently the rope of toffee is made by a batch feeder, into which the plastic toffee is fed. Indeed, for the fastest wrapping machines such a batch feeder is necessary. The illustration on this page is of a "plastic cut and wrap" machine fitted with a batch feeder. The fastest of these machines wraps as many as 750 pieces of toffee per minute, which is about 5 cwt./hr.

With all processes of handling toffee it is necessary to ensure that the various operations are performed with the material at the correct temperature. If it is too hard it will form unsightly cracks and damage the machinery. If it is too soft it will shape badly and stick to knives, etc. In either case, much scrap would be produced and output retarded.

Packing

The first operation in packing toffee is to wrap it in a suitable moisture-proof material. Waxed paper is the most common and large quantities are used for the purpose. Another wrapping material which is fairly popular is a waterproofed transparent regenerated cellulose. The waxed paper should be selected for the particular service required. The quantity and melting point of the wax are important. Insufficient wax gives poor protection from atmospheric moisture. A high melting point wax is desirable for the plastic process where the paper comes in contact with the hot toffee. If the wax has too low a melting point the paper will stick to the toffee. Wrapping papers must be free from odour. Objectionable odour may come from the wax or from the ink used for printing. Foils are used for wrapping toffee, but they are invariably lined with waxed paper.

Wrapping is done by machine except for large pieces such as slabs. The plastic "cut and wrap" machine has already been mentioned. Machines wrapping cut pieces are usually chain fed.

Caramels are sold unwrapped, packed in a similar manner to chocolates. This type of packing calls for little comment here. The caramels themselves are little affected by atmospheric moisture, but being soft are packed with a view to avoiding undue stress.

A Plastic Cutting and Twist Wrapping machine fed by Hansella batch feeding machine. (With acknowledgments to Baker Perkins, Ltd.)

The ideal pack for wrapped toffees would be substantially airtight and so designed that the stress on the sweets in the lower layers is not excessive. The popular flat 4-lb. tin box with an adhesive tape seal approaches the ideal. Unfortunately it is not always economically possible to use this pack. The larger tin, with or without sealing, comes next in desirability, followed by the 7-lb. cardboard box and lastly the 28-lb. wooden case. The last form of packing should only be employed where a quick sale is assured, for not only will the toffee become damp and grain quickly, but the lower layers will become pressed out of shape. Whenever wooden cases are used it is important that the wood should not be damp.

Toffee and caramel should not be stored for a long time. Shelf life depends on the nature of the sweet itself and how it is packed and stored. In favourable conditions a shelf life of six months should be obtained. When the conditions are less favourable, a considerably shorter life can be expected. Storage space should be dry and cool; not too cold or moisture will be absorbed when the goods are removed to a warmer atmosphere.

As with all confectionery it is to the advantage of all concerned to ensure that toffee and caramel are presented to the consumer in an attractive condition. The manufacturer's responsibility has not finished when he has made and packed his goods satisfactorily. He must, in addition, do his utmost to ensure that their subsequent treatment will not undo his good work.

PROGRESS AND DEVELOPMENT in the BAKERY TRADE

(Continued from page 319.)

Raw Materials

Considerable attention has been given to special cake-making flours which have been introduced to the trade. These have been produced after much research, and resemble the type of flours used for cake making in America. These flours are of a very short extraction and have a higher *p*H value than ordinary flours—thus influencing their absorption and behaviour very considerably. When using these flours it is necessary to increase the sugar content of the mixes and also use extra liquor. If this is done remarkably good results are obtained, the most noticeable being increased volume and a finer, more velvet-like crumb in the cake. These flours command a higher price, and provided they are used in cakes which are sold by volume and not weight they should prove popular; similarly, their use in cakes commanding a good price may prove them to be the cake flour of the future. The introduction of them to the English trade is opportune, since insufficient attention has been given to flour quality and nature in flour confectionery in the past, so often one grade of flour being used for all purposes.

Shortenings or Margarine

When butter reached the peak heights after the war, margarine became the generally accepted fat for cake making. Many types of shortenings have been introduced since that date, many of which can be used to produce good cake. In America hydrogenated shortenings have been popular for many years, but when introduced to this country many years ago they were not well received. The main factor against them was their hardness and the time taken for creaming. Much interest is being shown in these fats both by manufacturers in this country and from America. It is quite likely that some of these will be exhibited next week at Islington.

In America these shortenings have almost completely replaced margarine. Whether the same change takes place in this country depends very largely on the policy of the manufacturers of both hydrogenated fats and margarine. To-day margarine is being made without milk, so that it is mainly an emulsion of fats and water coloured to a similar tint possessed by butter and flavoured with some variety of butter flavour. Fundamentally the only difference is that hydrogenated fats are free from moisture whilst the margarines contain up to their legal limit. In all mixings where hydrogenated fats replace margarine allowance must be made for this factor. From the eating viewpoint hydrogenated shortenings produce very good cakes with a flavour equal to that obtained with margarine and some butters.

It is likely that we shall see a great fight in the future between the hydrogenated fat manufacturers and the margarine manufacturers, except in the case of the several combines who deal in both.

The proper development of such shortenings will largely depend on an efficient service bureau being inaugurated which will issue recipes and advise on their use. Already several such bureaus are available in this country and are being developed on the lines of the American research and service organisations. It is likely that we shall see still further development.

Five years ago in America a simplified method of cake making was introduced in which all the ingredients were blended in one operation. Whilst some success attended the early efforts, as the idea was tried out on a wide scale so the method died out. The main reason for the failure was that excessive mechanical working was so often given to the mixings—probably considered necessary in view of the incorrect selection of materials—and so coarse-textured, dry-eating cake resulted.

The development of cake both in this country and in America seems to be along the lines of producing cake which will eat moist and retain the sensation of moistness on the palate.

CORRESPONDENCE

Bacon Factories and their Design

From W. S. Douglas, B.Sc.

SIR : Dr. Callow's article on Bacon Factories, coming from one of his authority, deserves, and I think will receive, careful study from all interested in bacon curing.

I was particularly interested in his remarks on automatic control for the refrigerating plant. There is no doubt that the automatic principle should be adopted, whenever possible, for bacon curing purposes. It has several advantages, of which the following seem to be the most important :

(1) The temperature control is exact, and exact humidity control can also be arranged if necessary.

(2) The chilling of the carcase is continued to a finish instead of being interrupted, as it often must be with a hand-controlled plant. It is generally acknowledged that the effect of such interruptions is not good.

(3) Superior economy. No more refrigeration is delivered than is required. The operating conditions for the machine are improved.

(4) Saving in labour. No attendant is required.

(5) Saving in space, both in engine room and cold rooms.

It would be interesting to hear Dr. Callow's views on the desirability of chilling the pigs without allowing them to cool out first in the hanging room. Beef and mutton are treated in this way in both North and South America, and the writer has recently arranged a plant for chilling beef, without previous hanging, in this country. The Australians have also followed the same principle in their newly developed chilled beef business.

The results, so far as the quality and keeping powers of the meat are concerned, are found in practice to be superior to the old method. Is it not possible that similar results may follow in a bacon factory? At all events, it is a point which seems worth investigating.

Dr. Callow's reference to cross-pipe coolers is interesting. The transmission across such coolers, as shown by Griffiths and Awberry, is much better than when the air flows parallel to the pipes. In actual practice, however, one is apt to find that while the principle pays in large coolers, in the smaller ones the extra cost of construction per square foot of cooling surface just about neutralises the gain due to being able to use a smaller surface.

One must congratulate Dr. Callow on his thoroughness in detail. Such small points as the return rail to the killing point for empty shackles, and the lower floor level for black scraping, are all too often overlooked, but it is the accumulation of such small things that makes for factory efficiency.

The English trade does usually, as Dr. Callow says, call for a delicate " roast " flavoured lard, sometimes slightly flavoured, sometimes more fully flavoured, as in the mining areas, etc. This we find can best be produced by the use of open rendering pans, by the aid of which, with proper handling, the flavour can be adjusted to a nicety. Pressure rendering, we find, is best reserved for those cases where a steam-flavoured or more neutral lard is called for.

Much could be written on the subject of by-product plant for bacon factories. In some factories edible material is wrongly treated in a dry rendering plant. The dry rendering plant should be kept for condemned and inedible material if there is enough of it, but edible material will yield better products, with a correspondingly improved financial result, if handled by the wet rendering process—that is to say, in a digester. The ideal combination in a large factory would appear to be a dry rendering plant for the inedible material, with a digester plant for the edible residues.

The results of the experiments mentioned by Dr. Callow, which are being carried out in an attempt to determine the effect of transporting live pigs over a distance, on the pig itself and on the resulting bacon, will be awaited with the deepest interest. It will no doubt be a little difficult, in making comparative tests, to eliminate all the other variables, but, if that can be done, the data obtained should be very valuable and of the greatest importance, for obvious reasons, to the industry.

W. S. DOUGLAS, B.Sc.,
Director of Wm. Douglas and Sons, Ltd.

The Bread Advertising Campaign

From R. N. Wheeler, B.A.

SIR : I have read with interest the controversial letters concerning the bread campaign which you have printed from time to time, and so far I have seen no direct criticism of the method of advertising which has been used.

I have no doubt whatever that bread is a difficult thing to advertise, but it seems to me that those concerned have been working on entirely wrong lines. Most of the advertisements I have seen have consisted of pictures of athletes, with such slogans as " Bread for Energy " and " Athletes Train on Bread ". Surely nobody imagines that athletes would train on bread. It is probably the one article of diet which they would exclude. Take, for example, the advertisement which depicts a man sculling. Now, I think most people will agree with me that the men who row in the Boat Race are trained along first-class lines. Their diet is not an extraordinary one, but bread is rigorously excluded from it, except in small quantities as toast. No bread, as such, is eaten. This is a fact I know to be true, and many times one reads of this in articles concerning the Boat Race. Surely this suggests that such advertisements are not based on true facts at all and can therefore be of little value in the long run.

Why advertise bread as a food for athletes? I imagine it is because the advertisers think that everyone has a secret desire to be athletic. This may be so, but if it is not a sound fact, and the illusion is frequently shattered by newspaper articles, I don't think it can be worth much.

This, I know, is all destructive criticism, and I will now try to suggest something better. I heartily agree with Mr. Ruffman that the quality of bread should be improved. If this were done the fact could then be advertised, not by pictures of athletes, but by advertisements with a more abstract idea, perhaps, which would appeal to the eye. I am more and more convinced every day that advertisements which primarily appeal to the eye, without carrying any extravagant claims, are the most effective. An example of advertising of a different, but an excellent kind, is that of the Underground. In the case of bread, however, it is necessary to produce striking ads. which catch the eye and then appeal to the stomach. I would suggest a picture of a lunch consisting of appetising looking bread, as the main subject, with Stilton cheese, lager and possibly celery as subsidiaries—something like the ad. for Jacob's lager. I feel this would be of definite appeal and far better than the present " Athletic " ads.

R. N. WHEELER, B.A.

Reply from Dr. Callow

Mr. Douglas raises a point of great interest in his letter—viz., the rapid cooling of carcases in the bacon factory as opposed to the more usual method of cooling the carcases overnight at ordinary temperatures. This widespread practice is doubtless due, in part, to the fact that a considerable amount of cooling can be obtained without any cost for refrigeration. It is, however, a fact that many curers who have experimented with rapid cooling in their chill rooms have gone back to the traditional method of slow cooling in air because rapid cooling has increased the incidence of slime or of taint. The reasons for this are still obscure and are being investigated by the Food Investigation Board. Until we understand this matter in some detail it would be very unwise to advise curers to adopt the rapid cooling of their carcases, in spite of the fact that rapid cooling is undoubtedly successful for chilled beef and in the American ham industry.

INDUSTRIAL NEWS

Awards at Health Exhibition

The awards made at the Health Exhibition held recently at Southport under the auspices of the Royal Sanitary Institute contained the following: Roger Field Gold Medal for an exhibit of pre-eminent merit from the hygienic point of view, United Dairies, Ltd. (exhibit showing methods of hygienic production and distribution of milk). Silver Medals —Ambrosia, Ltd. (Ambrosia milk products), Cow and Gate, Ltd. (Cow and Gate milk food products), Glaxo Laboratories, Ltd. (products embodying results of recent research in nutrition), Nestlé's Milk Products, Ltd. (Nestlé's products).

International Bakers' Exhibition

The fifth International Bakers' Exhibition (Exposition du Grain au Pain) is being held at the Institut International d'Alimentation, 73, rue Montagne aux Herbes Potagères, Brussels, from August 10 to September 12. The show includes sections for bread, pastries, biscuits, confectionery, and bakers' and confectioners' outfits and equipment.

Income Tax Guide

This firmly established annual publication of Jordan and Sons, Ltd., has now reached its fourth year, and readers will find it very useful, as the alterations in the rates of taxation and in the allowances affect most taxpayers. Anyone in doubt as to the working of the new scales of taxes and allowances will find that in this booklet the information is provided in a concise yet comprehensive manner. The Budget results in an actual decrease in the amount of tax payable by the majority of small taxpayers, although it added 3d. to the standard rate.

Many worked examples are given as well as tables showing the tax payable on incomes from £125 to £2,000 for an unmarried person, a married couple with no children, married couple with one child, and a married couple with three children, and in addition "ready reckoner" tables show the tax payable at 1s. 7d. in the £ on from £1 to £135 and at 4s. 9d. in the £ on from £1 to £10,000. The book is priced 6d.

Sir William Dudley Retires

Sir W. E. Dudley, O.B.E., retired from the presidency of the Co-operative Wholesale Society at the quarterly meeting, which was held at Manchester on July 25.

Sir W. Dudley.

Sir W. Dudley, who was knighted in 1926, served on the Royal Commission on Food Prices, and the National Food Council during the war. Previous to this his war-time duties consisted of representing the Co-operative Movement on 14 State Departmental Committees, and on the Consumers' Council.

Award to Dr. F. G. Novy

Dr. F. G. Novy, former professor of bacteriology and dean of the Medical School of the University of Michigan, was awarded the 250,000th microscope produced by Bausch and Lomb at a luncheon given to members of the American Association for the Advancement of Science during its summer session at Rochester, New York. Dr. Novy was selected for this honour by the committee of the A.A.A.S. for outstanding research in the field of bacteriology and immunology. A student of both Koch and Pasteur, Dr. Novy has the distinction of being the only person in America to-day who studied under Pasteur. He is a Chevalier of the Legion of Honour (France) and a member of the Order of the White Lion (Czechoslovakia).

▼ ▼ ▼

The British Aluminium Co., Ltd., have opened a branch office and warehouse at Rose Street, Temple, Bristol 1 (Telephone No. 21747), under the management of Mr. O. Halliwell. At this warehouse the company will hold stocks of their standard products—*i.e.*, aluminium and its alloys in crude and semi-manufactured forms, including ingots, notched bars, sheets, tubes, and sections.

Mr. Charles Farmer Retires

Mr. Charles Farmer has retired after forty-six years in the chocolate and confectionery trade. He served five years' apprenticeship in the trade and then served with several of the leading manufacturers in England and Scotland. After having become manager of an old-established firm in Scotland, Mr. Farmer in March, 1914, joined the staff of Rowntree and Co., Ltd., and became responsible for the experimental work in the cream and centre making and uncovered confectionery department. Since the death of his wife in 1932 his health has suffered, hence his retirement at the age of sixty-one years.

Mr. G. S. Crossley, production director of Messrs. Rowntree, presented Mr. Farmer with a cheque in recognition of his loyal and fruitful service and also a very useful and handsome present as a mark of the esteem in which he was held by his many friends at the Cocoa Works.

Borough Polytechnic Food Classes

A class in the subject of Foodstuffs is being held at the Borough Polytechnic for the benefit of men, other than technical chemists, who are engaged in the manufacture, distribution, or control of foodstuffs.

The lectures deal in as general a way as possible with the nature of foodstuffs and food accessories, their function in the diet, etc., and the application of principles and materials to the foodstuffs industries. This course has been found useful to food inspectors, refrigeration engineers, and distributors of foodstuffs.

The classes are held in the evening from 7 to 9.30, and commence on Thursday, October 1. Further particulars may be had from the Principal, Borough Polytechnic, Borough Road, S.E. 1.

▼ ▼ ▼

Mr. W. H. Stevens, A.R.C.S., F.I.C., being no longer a member of the firm of Henry P. Stevens and Son, consulting chemists, of 15, Borough High Street, S.E. 1, all communications should be addressed to him at Shirley, Page Heath Lane, Bickley, Kent.

New Angus Factory on Tyneside

George Angus and Co., Ltd., of Newcastle, have started, in their newly erected modern works, the manufacture of improved Oil Seals of the self-contained unit type, widely used to prevent oil leakage from and to protect bearings. The sealing member is accurately formed from specially tanned and processed Chrome Leather and resisting, it is claimed, temperatures of 250° F. and shaft speeds up to 45 feet per second. Seamless rubberised Chrome Leather Concertinas, Gland Leathers and Gaiters, are also manufactured in a large variety to customers' requirements.

Mouldings are being made from a composition material, "Gaco", which, although similar in appearance to rubber, does not contain rubber and is claimed to be fully proof against all lubricants and fuels. Elastic but non-porous and resilient, it is stated to be ideal for all oil sealing, pneumatic and hydraulic applications.

Walworth Development

Messrs. Walworth, Ltd., have recently moved their Engineering Department into new and larger premises made necessary by the growth of this department. The new workshop is in Ewer Street nearby their Head Office at 90-96, Union Street, London, S.E. 1. There is ample floor space for laying out large work, and the mechanical equipment includes Pipe Screwing machines, Benders, Lathes, Grinding and Polishing Wheels, Blacksmith's Forge, etc.

▼ ▼ ▼

The Department of Commerce of the Commonwealth of Australia has moved from Melbourne to Canberra. Communications should now be addressed to The Secretary, Department of Commerce, Canberra F.C.T.

A view of the new Engineering Department of Messrs. Walworth, Ltd. A note on this development appears on this page.

A Survey of Industries in Hull

The Development Committee of the City of Hull has for several years through its Information Bureau placed at the disposal of enquiring industrial firms a very considerable volume of facts and figures relating to the city and the Humber area. Recently the Corporation of Hull has issued an interesting brochure entitled "A Survey of Industries", being a survey of imports, raw materials, and synthetic products and their relationships to the old and newer industries, with special reference to the Humber area. This survey has been prepared by their City Analyst, and is an extension and revision of a list of imports and raw materials which has long been in use in the Information Bureau of the City Development Committee.

This volume of over fifty pages has an exhaustive key or index which makes for ready reference to its contents. The first section deals with the newer plasticisers and solvents, and a later table gives a full account of these products. Leather-cloth and cellulose products of varied kinds next come in for review, followed by the synthetic resins, adhesives, emulsifying agents, silicon compounds and artificial perfumes and flavouring agents.

Various parts of the publication deal directly with the materials used in the production of foodstuffs for man and animal. The third port in the country, Hull is first in the important fishing industry. Food products made from fruits and vegetables, grain of various kinds and oil-seeds are set out in tables, as is also the large-scale production of feeding cakes and meals and fertilisers.

The whole volume forms a work which all engaged in the types of industry surveyed, and indeed many other business people, will find to be a mine of information set out in a readable way and critically presented. All those interested will receive a copy of the brochure on application.

Ginger

This is the title of a small booklet published by Stafford Allen and Sons, Ltd., following a visit of Mr. G. Stafford Allen, one of the directors, to Jamaica a short while ago. The first half of the booklet gives a short account of the cultivation of ginger in Jamaica and elsewhere and of the drying and blanching process which the root undergoes. The second half deals with the ginger products manufactured by this concern, including powdered gingers, oleo-resin gingers, essential oil of ginger and tinctures.

Colonel M. D. Methven, who has been appointed General Manager of the North-eastern Trading Estates, Ltd., the non-profit making trading estate.

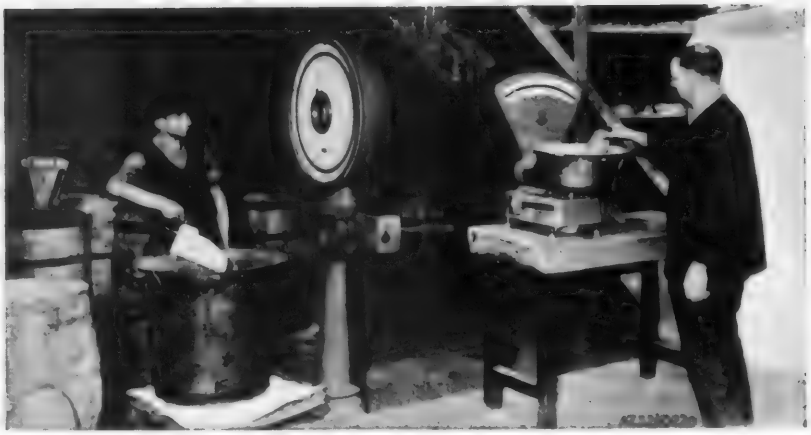
Special Area Development

Lieut.-Col. M. D. Methven, B.A., O.B.E., has been appointed general manager to North-Eastern Trading Estates, Ltd., the first of the non-profit making trading estates to be set up under the powers granted to the Commissioner for the Special Areas.

The site and features of the trading estate at the Team Valley, Gateshead, should be of interest to industrialists, large and small. The estate is set on the verge of glorious country and it lends itself to layout on modern architectural lines. Housing accommodation will be available as the growth of the estate necessitates it, and such amenities for employees and executives as canteens, clubhouses, and playing fields form part of the scheme. First-rate transport and power facilities will be available.

Morton "Vortex" Mixer

This machine, made by the Morton Machine Co., has been specially designed to give rapid mixing or dispersion of liquids without any aerating effect. It can also be used for dissolving salts and crystals in liquids and can be fitted with both heating and cooling devices. The machine has a large container, which can be made of stainless steel, Monel metal, or standard copper finish tinned inside. The Vortex impeller is driven through the bottom of the machine and consists merely of a series of angled blades with a central aperture. When the machine is running the blades draw the liquid down the centre and expel it against the sides.



Three self-indicating scales made by W. and T. Avery, Ltd., weighing ingredients for mixtures. The large platform machine is used for the larger quantities, the operator balancing off by means of tare beams the weight of the empty container. The machine is provided with a movable inner chart, so that each ingredient may be weighed from zero. The machine on the right weighs the smaller quantities required to make up the batch, and a fine balance for weighing sample mixes is seen on the left.

Pumps for the Food Industry

The "Drum" Engineering Co., Ltd., Humboldt Street, Bradford, have sent us particulars of some of the pumps they have made for the food industry within the last few months. A number of pumps 2 in. and 2½ in. size, having a capacity of 10 or 20 cwt. of molasses per hour, have been supplied to companies going in for or extending their manufacture of cattle foods. A stainless steel pump, motor driven and mounted on a portable trolley, having a capacity of 10 gallons per minute of fruit juices is now being made for South Africa. A 1-in. brine circulating pump in gun-metal having a capacity of 600 gallons per hour has been manufactured for a refrigerating plant, also a heavy glucose pump having a capacity of 20 tons per hour of heavy glucose. Three small pumps having a capacity of 2,500 gallons per hour each of hot animal fat, three all gun-metal 6-in. motor driven pumps each having a capacity of 425 gallons per minute for beer, and one 20 ton molasses pump, viscosity up to 100,000 seconds Redwood No. 1 against a pressure of about 200 lb. per square inch, have also been supplied recently by this company.

V-Rope Variable Speed Pulleys

The Crofts patent V-rope variable speed pulleys, made by Crofts (Engineers), Ltd., embody the principle of contracting and expanding cones, which form together V-shaped grooves to fit the ropes. When opened or closed the cones increase or decrease the effective pitch diameter of the ropes in the pulley grooves and consequently the speed of the drive. The pitch of the grooves remains constant throughout the speed variation, and there is no lateral movement of the rope at any time. The pulleys give infinite speed variation up to 2 to 1 (single drive) or 4 to 1 (double drive), can be fitted with either automatic type or stationary type speed adjustment, and powers up to 100 h.p. can be obtained.

Hyposynchronous Motors

For fluctuating load conditions the hyposynchronous motor of Laurence, Scott and Electromotors, Ltd., is of interest. It consists of an ordinary slip-ring induction motor operated in conjunction, as a complete unit, with a "Heyland" exciter. Essentially the latter is a small 3-phase electric generator of simple design, driven in any convenient manner, connected to the slip-ring terminals of the motor, which improves the power factor of the latter automatically up to about 1·0, the ideal figure. It is to be noted that when the power factor of a given establishment purchasing electricity is satisfactory, the electricity authorities will reduce the price of current to the power user. The general application covers all fluctuating load conditions, such as pumps, conveyors, rotary screens and air compressors, while almost any existing slip-ring induction motor of not less than about 50 h.p. can be fitted with a "Heyland" exciter and converted to hyposynchronous operation.

▼ ▼ ▼

Plans have been passed by the Glasgow Dean of Guild Court for a big extension to be carried out at the confectionery factory of Messrs. Birrell, Ltd., Anniesland.

TRADE LITERATURE RECEIVED

Device for Handling Acids and Liquids

E. M. Francis, Ltd., have published a leaflet describing their Topsel unit. The unit consists of two large glass jars located on a metal base and hermetically sealed by a similar shaped top-plate. On the top-plate is fixed an ordinary metal air-pump, the purpose of which is to inflate a stout rubber bladder in one jar, also a knurled washer which acts as a release valve for deflating the bladder. The two jars are interconnected by an air-duct located in the top-plate. The liquid jar is filled by deflating the bladder in the other jar, and the liquid is then expelled by inflation of the bladder. By this means the liquid jar can never be overfilled, and it is impossible for any of the liquids to get into the jar in which the bladder operates. It will be seen that this arrangement enables practically every acid and liquid, except hydrofluoric acid, to be pumped and extracted from large containers by the operation of an ordinary metal air-pump without any possibility of the liquid or fumes coming into contact with any part of the pump.

Aluminium Tubes and Pipes

Its combination of valuable qualities—freedom from rust, resistance to corrosion, light weight, and high thermal conductivity, in particular—has given aluminium a great variety of uses in the food and allied industries. These include condensers, stills, heating and cooking coils, and miscellaneous ducting. This gives point to a new booklet issued by the British Aluminium Co., Ltd., "Aluminium Tubes and Pipes". Common sizes of this form of the metal are set out with weights, calculated in pure aluminium, which do not greatly differ from weights of the aluminium alloys in which tubes are drawn for specially strenuous service. The booklet includes tables of safe internal pressures of aluminium tubes, together with a handy list of aluminium pipe fittings—bends and sockets.

▼ ▼ ▼

The new edition of *The Food Reformers' Year Book*, 1936-37, is now in course of preparation. It will be about 128 pages in length and the price will be 6d.

Photomicrographic Equipment

Commencing with a review of the governing factors in photomicrography, a booklet issued by Bausch and Lomb Optical Co. then describes the photomicrographic equipments, cameras, microscopes, and accessories made by the company. A glance at the booklet shows that a complete line of co-ordinated photomicrographic equipments, in which the operating needs of the worker are fully supplied, is available. A leaflet entitled "Know Your Pack", also issued by Bausch and Lomb, is of particular interest to food manufacturers in that the instruments mentioned therein are being more and more used as the industry develops technically and scientifically.

Modern Fire-Fighting

This is the title of an attractive and well-produced handbook of 76 pages published by the Pyrene Co., Ltd. Its opening pages tell the reader that Great Britain recently recorded 1,608 deaths from fire in one year, annual fire losses on property alone averaging about £10,000,000. Other contents include causes of fire, principles of extinction, fire insurance rebates and hints on fire prevention. There are also many interesting photographs and complete particulars of fire extinguishers, appliances, and installations using all approved extinguishing media and covering every class of fire risk, including oils and spirits, with complete installations for storage depots.

Tool and Die Steels

Thomas Firth and John Brown, Ltd., have published a catalogue describing the tool and die steels made by the company. These comprise carbon tool and die steels, high speed tool steels, alloy tool and die steels, steels for die blocks and special steels for special purposes. A supplementary pamphlet gives indications as regards the hardening and tempering of the steels.

Electric Furnaces

A new brochure has been issued by Wild-Barfield Electric Furnaces, Ltd., dealing with their "Heavy-Hairpin" and "Tubular-Hairpin" furnaces. Details are given of the design and construction of the furnaces, replacement of the elements, forced air circulation, automatic temperature control, time switch, atmosphere control, etc. The makers will be pleased to send a copy of the brochure to any reader on application.

Trusoy the Modern Manna

We have received from the British Soya Products, Ltd., a booklet entitled "Trusoy the Modern Manna", which deals with the possibilities opened up for the soya bean by the "Tussaud Process". It is stated that although the extraordinary nutritive value of the soya bean has long been recognised by the manufacturers of foodstuffs, they have hitherto been unable to make full use of it in production due to the bean's extremely bitter flavour and high fat content causing rancidity. The patenting of a method of milling, known as the "Tussaud Process", opened up vast possibilities for the soya bean by this treatment. British Soya Products, Ltd., have made extensive experiments with various food products with a view to giving assistance to different types of food manufacturers, and they will be pleased to give the necessary information to enquirers.

Syringes

Frank Bryan and Paton, Ltd., 28-30, Paternoster Row, London, E.C. 4, have sent us a leaflet describing their syringes for milk and cream testing. They can be used to deliver a given quantity only that is either 5 c.c. or 11 c.c. or to deliver any number of c.cs. from 1 to 5 c.c. or 1 to 11 c.c. These syringes speed up Gerber testing as one pipette is cut out in each test.

Vicaplant Bulletins

These bulletins are issued from time to time by T. and T. Vicars, Ltd., Earlestown, Lancashire, England, to illustrate and describe the plant manufactured by this company for the production of biscuits. Each issue of the bulletin features some particular type of plant. Of the three issues sent to us the first deals with Automatic Biscuit-making plant, the second with Automatic Biscuit Plant (Rotary Moulding Section), and the third with Various Units of the Biscuit Factory. Each of the issues contains a number of illustrations, together with appropriate descriptive matter.

The Collis Stacker

A leaflet has been issued by J. Collis and Sons, Ltd., describing the Collis hydraulic portable stacker which is included in the exhibits at the Home Office Industrial Museum. It is claimed that pumping up a load halves the input energy which a winch handle necessitates and that easier lifting is maintained throughout the capacity range of the stacker by proportioning the hydraulic unit to the load and providing ball bearings throughout.

▼ ▼ ▼

The Scottish Milk Marketing Board has opened a new cheese factory at Bennicarigan, Isle of Arran.

A view of one of the three new bays, having a total floor space exceeding 100,000 sq. ft., which comprise the extension, now nearing completion, to the works of G. A. Harvey and Co., makers of metal perforating, wire weaving, sheet metal, steel platework, etc.

BREAD CONSUMPTION and FLAVOUR

The possible causes of changes in the flavour of bread during the past fifty years or so are discussed by A. M. MAIDEN, Ph.D., B.Sc., A.I.C., who concludes that the drop in consumption of bread cannot be blamed upon the "wrong" flavour of present-day bread.

DURING THE past few years bread flavour has been a subject always in the minds of those interested in the baking trade. The consumption of bread has decreased appreciably even during the period since the war, and hence the amount of profit available to the people selling bread has decreased. The millers as well as the bakers have begun to worry about the problem, and in an effort to stay the drop have embarked on their extensive advertising campaign. Under conditions such as these, when things are going wrong and there is no evident reason why, an explanation is always provided which throws least discredit on those whose business it is to see that things go right. In the baking industry bread flavour has been the scapegoat. For some reason or other it is declared that the flavour of bread is not what it used to be. One never gets that "nutty" flavour that the grey-beards always mention in this connection in the next breath to discussing the delights of the farmhouse bread that they consumed in their youth, which would keep in perfect condition for a week. However convenient this lack of flavour in bread may be as an excuse for a falling trade, will it bear critical examination?

In all cases in which the past is being exalted to the discredit of the present it is as well to be sceptical. The human memory is a frail thing at the best of times, and when the possibility of checking its recollections against facts does not exist, one must be exceedingly wary of accepting its products as unbiassed evidence. It is obviously only the older people amongst us who can pass any opinion at all on this problem. Now as one grows older one inevitably becomes less energetic and loses that hearty appetite which is the traditional prerogative of youth. And how much better everything tastes when the appetite is hearty. After all, hunger *is* the best sauce. Well-fed business men must frequent those places where the culinary arts are practised at their highest to get real enjoyment in eating, while the young tramper after a day on the hills will even then get twice as much enjoyment out of the simplest meal served under relatively primitive conditions. Thus the evidence that bread has changed appreciably for the worse in flavour must be considered to be very slight. Even if it is granted that a slow change in flavour has occurred through the years, there is still less evidence that a sudden reversion to the bread of thirty years ago would be acceptable to the majority of the bread eaters of this country. In all matters of flavour one likes what one has been used to, and automatically tends to dislike the novel.

Has Bread Flavour Really Changed?

Let us consider the problem from a new angle. Is there any likelihood that the flavour of bread has changed? Here it must be admitted that there is a strong possibility that "yes" is the correct answer. Bread stands in rather a unique position. It is one of the basic foodstuffs—one that is always eaten with something else. Amongst the poorest people, lard or margarine is spread on it, those slightly better off spread it with butter and eat the combination with either jam or cheese or something of that nature, whilst still higher up the social scale it is usually eaten in the form of rolls as an accessory to something more important and tasty. Bread has achieved this universal position because it is a substance with only a delicate flavour, and a flavour that blends well with most others. A strongly flavoured bread could never reach the niche that bread as we know it has achieved.

Source of Bread Flavour

As yet we know absolutely nothing about the source of bread flavour, or about the nature of the flavouring substances. Under these conditions we can only generalise and state that all the ingredients may play a part. The fermentation process is also significant, while the baking technique is undoubtedly of major importance. Let us examine each of these factors, and see in what way they have been changed in the last few decades.

Consider the flour first. In Table I. the imports of wheat grain into this country approximately each ten years for the past sixty years are shown divided into broad classes, the amount of each class being expressed as a percentage of the total imported.

TABLE I.

Exporting Country.	1934.	1923.	1913.	1903.	1893.	1883.	1874.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Canada ...	35	28	21	12	5	3	9
Australia ...	21	4	10	0	3	1	1
India ...	1	—	18	19	9	18	2
Argentine or Argentina	34	21	14	16	12	0	0
U.S.S.R. or Russia ...	2	—	5	20	15	21	14
U.S.A. ...	0·1	31	32	27	49	41	56
Other countries ...	7	16	0	6	7	16	18

It will be noticed that the proportion of Canadian wheat imported has increased steadily since 1903. Between 1893 and 1903 a sharp decrease in the proportion of U.S.A. wheat imported occurred, to be followed by a big drop to practically zero between 1923 and 1934. During these last ten years the proportion of Australian wheat imported has very definitely increased, while there has been a steady increase in the other great filler wheat, Plate, since 1883. Since the formation of the U.S.S.R. Russian wheat has also fallen to a negligible position in the table, and Indian wheat has been unimportant since 1913.

Thus since the commencement of this century there must have been a very radical change in the composition of the grists of our flours, but exactly what influence this change will have had on the flavour of our bread it is rather hard to say. Whilst there are certain generalisations, for instance, that English wheat yields good flavoured bread, while on the other hand Indian wheat usually yields poor flavoured, there is no detailed information, based on adequate experimental data, as to the quality of the various classes of wheat with respect to the flavour of the bread produced. Up to the present attention has been confined practically solely to the cropping power, time of ripening, resistance to disease and baking value of each wheat. As Professor Engledow emphasised in his recent lecture to the Food Group at Cambridge, the time has come when more attention should be paid to the question of the more subtle "quality" properties of a crop as distinct from the relatively easily investigated qualities such as yield per acre, which are at first sight of much greater importance to the producers.

The technique of the conversion of wheat into flour has, of course, advanced continuously, although the major advance made since the introduction of the roller mill over fifty years ago has been in so conditioning the different wheats by suitable adjustment of their moisture contents by wetting and/or warming that they reach the break rolls in the best possible condition for milling. All these advances in the technique of milling have been directed towards the production of a purer "white" flour, and whatever doubts may be thrown by certain people on the nutritive value of the product, it produces the type of bread that our people like and demand.

Effect of Improvers

The various "chemical improvers" used to bleach and to better the baking quality of flours are another advance of this century. In the 1911 edition of Jago's *The Technology of Bread Making*, for instance, acid calcium phosphate is regarded as an old and established improver, and the use of nitrous fumes and chlorine for bleaching is discussed. Ammonium persulphate was in 1911 only just patented, while, of course, benzoyl peroxide, potassium bromate and Agene were not yet known. The bleaching of a flour probably slightly reduces the quality of its flavour, whilst "improving" should result in better built loaves, and therefore loaves which are more palatable from the point of view of their "eating" properties.

Change in Technique

Baking technique has changed enormously in the last thirty years, due to the introduction of fast-working distillers' yeast and machinery. With the slow-working brewers' yeast in use formerly bread had to be made on a long process, such as 8 or 10 hour, and the use of sponges to help along the weak yeast was quite common. The resulting bread, baked into quartern loaves, would be very sour to our modern taste, and its crumb structure and ease of mastication would be regarded as distinctly mediocre. Distillers' yeast and machinery between them have made possible the factory bakery as we know it, and the pre-war years were notable for the development of this rationalisation in the baking industry. Simultaneously with the appearance of factory-made bread was the disappearance of the quartern loaf, and perhaps the tendency for tin bread to predominate over oven bottom.

Another comparatively recent development is the use by bakers of the modern types of yeast food, now practically a standard constituent of all bread. Their use certainly tends to regularity in bread made on a large scale, and inasmuch as the more efficient ones do definitely improve the crumb of a loaf, they help in producing better eating and therefore more pleasing bread.

The now universal use of improvers by millers and bakers is regarded as anathema by all those whose ideal it is to live on bread made from the wheat berry *in toto*. Such people, however, usually in such circumstances that bread forms an unimportant part of their diet anyway, overlook the point that the function of the wheat berry is solely and simply to feed the young wheat plant. Man has, it is true, learnt to grow it in such large quantities that a very large amount of it is available for human food and to this extent has diverted it from its proper goal. Very primitive man pounded wheat and baked it in the form of unleavened sheets. The introduction of the leavening process rendered bread more artificial than the previously eaten biscuits, but produced a more palatable and more digestible foodstuff. In exactly the same way the use of an "improver" which renders bread more pleasing æsthetically without any demonstrable bad effects must be looked upon as a desirable advance in technique, and not regarded as a machination of the devil.

The March of Time

Present-day bread is undoubtedly better than early Edwardian bread from the point of view of its appearance and eating qualities, and is probably made under distinctly more hygienic conditions. Its flavour has probably been changed, but that change has been so gradual that we have become accustomed to the new flavour without really noticing any change, and we therefore like it better than we would like the more acid bread of thirty years ago.

But authorities agree that bread consumption is falling. Sir John Orr, in his recent book, *Food, Health and Income*, states that between 1881 and 1934 bread consumption per head has fallen by 30 per cent. In view of the improvement in the quality of bread during this same period, how can this be explained? In the same report

(*Continued on page* 337.)

FLOUR CONFECTIONERY in the HOME

by Phyllis A. Peck, M.C.A

The author, who is a trained domestic scientist as well as a housewife, describes very clearly the point of view of the more enlightened housewife of to-day regarding commercial and "home-made" confectionery. The manufacturing confectioner has much to learn from the domestic scientist who is an expert in her own sphere and a discerning judge of what the housewife really wants.—ED.

IT IS within comparatively recent years that a definite revival of the art of cookery in the home has taken place. Perhaps it would not be overstating a fact to say that Englishwomen are becoming more "domesticated-minded", even including the vast numbers of them who are occupied during the day in making careers or a living for themselves. No doubt if this trend goes on uninterrupted by international upheavals, we shall yet be able to compete with those women of another country, who, by order of their Führer, have been sent back to the kitchen to show the rest of the world a picture of perfect womanhood.

There are to-day many sources of information available about home cookery, such as a wide selection of recipe books which range in price from nothing to the teens of shillings. Apart, however, from these sources of information, facilities are increasing for the teaching of cookery to girls and women, by means of Domestic Science Colleges, Schools, Technical Institutes, Women's Institutes, and Domestic Servant Training Centres. Free cookery demonstrations are also arranged by electricity and gas undertakings, not primarily, of course, to teach the actual art of cookery, but to advertise and sell the means whereby food may be more easily cooked.

Domestic science day and evening courses are available and many girls take advantage of them, but what is really needed is a training house where ordinary household cookery, marketing and dietetics could be dealt with in a practical form, applicable to a limited housekeeping allowance and with due regard to the life and circumstances of the individual. It might be profitable for the manufacturer of some well-known and saleable foodstuff to open a "Training House" for teaching cookery, etc.; or several manufacturers might co-operate in one large concern organised on really practical lines giving tuition which would be available to any person who wished to learn or improve her knowledge of household cookery. Housewives will always purchase branded and packet

foods to aid them in the selection and variety of the daily menu. These should promote the growth of home cookery rather than tend to discourage it, but so much is put up in packets and tins ready cooked that there might be a danger of the housewife becoming lazy, and lessening too much the time and energy spent on the preparation of meals. It would seem that the manufacturer and confectioner between them were doing their best to persuade women to do less and less in the kitchen and go to the pictures more and more.

Confectionery in the Home

Flour confectionery as understood by the housewife means food prepared from a basis of flour, fat, sugar, eggs and flavouring, etc., so combined as to produce an aerated dough of one type or another, and generally of a sweetened nature suitable for tea or for the sweet course of a luncheon or supper.

The word "confectionery", however, generally brings to mind commercially produced goods rather than the "home-made" product with which this article deals. "Home-made" are words increasingly heard and seen nowadays, for the growth of shops and tea-rooms displaying them is not to be disputed, and yet a glance in their windows would make one wonder sometimes how the proprietors manage to keep going, for the finish and appearance of the food so displayed often leaves a little to the imagination. There is no doubt that some quality beyond the external is the selling factor, for the food always has a ready sale. This is to be found in the flavour, texture and keeping qualities associated with home-made confectionery which implies the use of pure butter, shell eggs and other raw materials as normally obtained from the grocer. Housewives will even pay more for cakes bought from a home-made shop in order to secure "that little something that some others haven't got". As the demand for home-made confectionery is on the increase, the professional confectioner might realise that there is something wrong with his product and a study of the home methods of production and taste might well be to his advantage.

Where Commercial Confectionery Fails

Commercial confectionery is too often over-coloured, over-decorated, and of a "sameness" inside which becomes monotonous. To point out but one branch of this trade which is generally overdone, the small tea-time cake of about 1 to 2 lb. in weight. You may buy the fruit cake type, or the plain Madeira type, or the Genoese. More often than not the fruit cake tends to dryness, and lacks any attractive or individual flavour. Madeiras are usually better, but when it comes to Genoese the confectioner goes wild. It is often over-coloured, over-decorated, and with a synthetic flavour which no fresh fruit ever gave. Made-up cream is lavishly piped upon it, and coloured jelly, nuts and floral garnishes are added to complete the picture of a cake as far removed from a home-made article as possible. It may not be denied that the cakes sell, and there will always be tastes which approve such styles, but the field should be enlarged and more varieties offered which show individuality and simplicity of decoration, and a tasteful blending of pure ingredients which will produce tempting mixtures. Prices are a big factor, and it might be more reasonable to omit some of the expensive trimmings and put the quality inside.

* * *

At a garden party I heard of recently cakes, buns, sandwiches, etc., were supplied partly from a private kitchen and partly from a local confectioner, and it was a revelation to witness the rapid disappearance of the home-made cakes before the bought varieties were even touched. Appearance had little to do with their popularity, as those supplied by the trade were perfectly executed, of good quality, and in every way attractive to the eye. Readers may remember an article which appeared in the May issue of this year's FOOD MANUFACTURE dealing with a model bakery in Ireland. This concern runs a special department for the production of home-made confectionery, and no matter how great the orders small batches are made by hand, marking a definite distinction between machine-made mixtures and those made from small proportions by the more homely methods. The demand for home-made cakes and the success which has attended enterprise in the form of tea-rooms, shops and the like is attracting more and more people to this class of business, particularly the woman who is obliged to do something for her living and readily finds her cooking capabilities can be turned to profit.

Home Baking Difficulties

Now to consider the practical side of home baking. Women who have to will always learn enough of the art of home cookery to keep starvation from the door, but many of them are anxious to turn out first-class confections both for their own and their family's satisfaction, and possibly to bring them fame among their friends, but certain doors are inevitably closed to them and the commercial world guards its secrets well. Many processes and methods practised by the trade are only possible with special machinery and the aid of the skilled worker who has served years of apprenticeship, and the housewife should confine her attentions to the lines which best lend themselves to home baking. The types of confectionery which cause the ambitious but untrained housewife most trouble are, crisp glossy dinner rolls, shining soft icings, mock cream fillings, rich and fancy pastry, and the many yeast preparations which are so popular on the Continent and supplied here and there in England by the more enterprising baker and confectioner. Steam ovens, mechanical mixers, rollers, and other plant give results with which no home cook can compete. Another door closed to the housewife is that which allows access to the many varieties of ingredients supplied to the trade only, such as special flours, fats for different purposes, dried fruits, sugar and other raw materials, which help to give a finish and professional touch which is characteristic of the best type of shop confectionery.

Confectionery Foundations for Home Use

Home confectionery is generally confined to the making of cakes, pastry, scones, biscuits and variations of these,

and three methods employed in the kitchen are outlined below.

Plain Cakes.

The housewife prefers to use the simplest and quickest method compatible with the result she wishes to obtain, and the method will vary therefore according to the proportions of ingredients. The practice adopted for the plain cake is that of mixing together all the dry ingredients and adding the liquid ones at the end. A plain cake recipe is built up somewhat on the following plan:

½ lb. flour (self-raising or plain)
¼ lb. fat (butter, margarine or dripping, etc.)
¼ lb. sugar (granulated will do quite well)
½ lb. dried fruits (currants, sultanas, etc.)
1 or 2 eggs (according to the cost of eggs and state of housekeeping allowance)
Raising ingredients (unless self-raising flour is used)
Extra flavouring, such as lemon rind or vanilla essence
Milk to mix
Spices, etc., as preferred
Salt

These proportions may be altered slightly to suit individual taste, but a certain balance must be maintained, otherwise the method of mixing must be altered too.

In mixing the above, the flour and salt are sifted into a basin, the fat is rubbed in with the fingers until it is so finely divided as not to show amongst the flour. The other dry and flavouring ingredients are then added. Eggs are beaten to aerate them and together with the milk are mixed all at once into the mixture, and a dough of the required consistency is formed. By increasing the proportions, the cake is altered according to the amount of fat and sugar compared with flour. Should the fat and sugar be increased it becomes both difficult and inadvisable to rub the fat in because of the somewhat sticky and unmanageable mixture that would result. The plan is completely altered therefore, and we get the richer basis as follows.

Rich Cakes.

For a small quantity:

2 eggs
Their weight in shells in butter, sugar, and flour
Flavouring to taste

or for a larger quantity:

½ lb. flour (self-raising or plain)
6 to 8 oz. fat (butter or margarine)
6 to 8 oz. castor sugar
½ lb. dried fruits (or more, or any other flavouring desired)
2 eggs (or more)
Milk if necessary (according to the consistency required)

Here the fat and sugar are worked together and beaten with a wooden spoon, a process known to the housewife as "creaming", until the consistency is that of thickly whipped cream. In such a state it readily absorbs the eggs, which are put in without any preliminary beating, though it is quite customary for the home cook to beat them up first, and, since the advent on the market of a glass cylinder and plunger which makes a very good job of beating eggs, a great many do adopt this method. Where self-raising flour is used this preliminary beating is unnecessary. The eggs must be thoroughly incorporated separately with the creamed butter and sugar by beating, and adding just a little of the flour to prevent curdling the mixture. When this stage has been completed such flavourings are added as required, and they are sometimes mixed in during the creaming process; lastly the bulk of the flour is sifted and stirred in evenly but without extra beating or vigorous action, until a soft creamy and fluffy consistency results. Some recipes recommend that the eggs and flour should be added alternately until all are used, but the extra beating which the flour receives is apt to toughen it and make the cake less even in texture and aeration. Fruit, if used, is added last.

Both these basic recipes lend themselves to much variation of flavour, shape of cake, and general utility, and from one foundation the housewife is able to make several totally different cakes and buns without a separate recipe for each. The simplicity of the modern recipe and the ease with which it may be adapted has been responsible for eliminating some of the difficulties and terrors which cookery had for the beginner, in the days before a study was made of general principles and the whys and wherefores of methods.

Plain Cake Variation

The following table will serve to show how variety can be given to the simple basic recipe without upsetting the balance of baking qualities:

	Flour (Self-Raising or Plain).	*Fat.*	*Sugar.*	*Eggs.*	*Liquid.*	*Flavouring.*	*Special Additions.*
Basis	½ lb.	3 or 4 oz.	3 or 4 oz.	1	About ½ gill	6-8 oz. fruit	¼ teaspoonful salt
Cocoanut ...	½ lb.	3 or 4 oz.	3 or 4 oz.	1	About ½ gill	1-2 oz. cocoanut	¼ teaspoonful salt
Ginger ...	½ lb.	3 oz.	2 oz.	1	Just under ½ gill	Small teaspoonful ground ginger	2 tablespoonsful treacle or syrup, ¼ teaspoonful salt
Marmalade ...	½ lb.	3 oz.	3 oz.	1	Just under ½ gill	3 tablespoonsful marmalade	¼ teaspoonful salt
Rock buns ...	½ lb.	3 oz.	3 oz.	1	Less than ¼ gill	3 oz. currants	Spice if liked

(Raising ingredients must be added if plain flour is used.)

Richer Cake Variation.

	Flour (Self-Raising or Plain).	*Fat.*	*Sugar.*	*Eggs.*	*Liquid.*	*Flavouring.*	*Special Additions.*
Basic recipe ...	4 oz.	4 oz.	4 oz.	2	None	Vanilla essence, lemon or orange rind	Pinch salt
Chocolate ...	6 oz.	5 oz.	6 oz.	3	2 tablespoonsful	Vanilla essence	Chocolate powder or cocoa
Walnut ...	½ lb.	6 oz.	6 oz.	3	1 tablespoonful	—	Walnuts
Cherry ...	½ lb.	5 oz.	5 oz.	2	1 tablespoonful	—	Cherries
Madeira ...	10 oz.	8 oz.	8 oz.	4	None	Vanilla or lemon rind	Citron peel
Fruit	7 oz.	4 oz.	4 oz.	3	None	Pinch spice	½ lb. mixed fruit
Rich fruit ...	10 oz.	8 oz.	8 oz.	4 (or more)	2 tablespoonsful	Vanilla and almond, spice etc.	½ lb. mixed fruit or more

In all recipes fat must not exceed half the amount of flour. Small buns and little cakes are made up on the same principle and merely cooked differently.

Richer Cake Variation

The sugar and fat are usually the same in weight and the flour may be the same or more. By increasing or lessening the sugar and fat and substituting a variety of flavours, etc., very different results are obtained. Space does not permit of a wide selection being given, and as this is the usual foundation on which the majority of housewives work, endless examples come to mind for providing originality of flavour, shape and finish, as shown in the table above.

Sponge Mixtures.

The housewife generally uses two varieties of this class of goods:

(*a*) Eggs, sugar and flour
(*b*) Eggs, sugar, butter and flour

(*a*) Proportions vary little, but the sugar and flour are usually equal in weight, or the sugar may be slightly in excess. Eggs are also numerous, for the mixture depends upon aeration from beating for its lightness.

2 eggs
3 oz. flour
3 oz. castor sugar

(*b*) This type is richer and contains butter, introduced by warming it to melting point, then cooling, and pouring it in with the flour.

2 eggs
3 oz. flour
3 oz. castor sugar
2 to 3 oz. butter

The method of assembling these ingredients is to whisk together the eggs and sugar in a basin. A whisk is used which consists either of loops of wire bound to a handle, or one made in the form of a miniature tennis racket with wire netting stretched across. This beating alters the appearance and consistency of the mixture, turning it into a pale creamy and thick substance much resembling whipped cream and clearly showing the impression of the whisk when removed from the surface. At this stage flour is sifted and "folded" in, and where butter is used this is also added gradually, at the same time turning the whole mass over and over with a tablespoon in order to blend the ingredients without robbing them of the air which has been incorporated.

Sponge mixtures lend themselves less to variations than other types, but the housewife employs creamy fillings and icings, and of course such flavourings and colourings as required, to make either Sponge Sandwich, Sponge Fingers, or a deeper cake, cut and sandwiched to form a layer cake.

The Value of Self-Raising Flour

Finally, reference must be made to the use of plain flour with baking powder, or a reputable brand of self-raising flour. There is still some prejudice against the use of the latter, much of which is encouraged and fostered by training colleges, who teach solely the use of plain flour and a separate raising ingredient because of the fact that some mixtures do not require any chemical aeration, whilst others require only a little and some a great deal. This may be true in theory but does not always follow in actual practice, and it is a fact that the majority of untrained housewives do get consistently better results by using self-raising flour than by the system of adding a varied amount of baking powder or other agent to plain flour. Modern methods of manufacturing self-raising flour are far beyond what they used to be and well-known brands of this type are specially and scientifically milled and blended to make a perfect foundation for cakes, puddings, pastry, yeastless breads, sauces, soufflés, in fact for all household purposes. It is not, I believe, generally used by the trade confectioner, and it may be that with the increased acceptance of self-raising flour, and as a more general recognition of its utility comes about, its use will become more popular and the standard of cake making will improve.

TO-DAY'S OUTLOOK for SOYA FLOUR

By A. A. Horvath, Delaware, U.S.A.

IN 1934 Mr. James F. Bell,[1] deploring the enormous decrease in bread consumption (27 per cent.) in the United States during the past quarter of a century, wrote that

"the way back is through the palate. The appeal must be made to the appetite. The old type of products, the old styles, the old methods will not avail. We must tax our initiative, resourcefulness and ingenuity to create and present new baked products with better flavour and appeal".

Processed whole soya flour seems to be destined to play an important rôle in this revival.

"A well-baked soybean bread possesses an attractive crust, a rich cream-yellow crumb and has an agreeable aroma and taste, in other words, it has the appetite-appeal."

Such is the conclusion reached by the Food Research Division, U.S. Department of Agriculture.[2]

In amounts of 20 per cent. of the mix (and less) soya flour is an ideal supplement to wheat for bread and macaroni products, and could be responsible for the general shifting of wheat products from the class of energy-producing foods to a level of full-value foods. Soya flour is the miller's best friend and may help to recover some of the losses in wheat consumption which have occurred as a result of the substitution of machinery for manual labour as well as the advent of the automobile.

Substantial amounts of soya flour are to be manufactured from the 1936 soybean crop of Manchuria, nearing the 150,000,000 bushel level, of which a large part is going to England, and £6,000,000 worth are to be shipped to Germany.[3] And in the United States, the record 1935 soybean crop of 40,000,000 bushels kept busy a number of industries, among them nearly 15 soya flour mills.

Processing Soya Flour

Correctly processed whole soya flour possesses a sweet, pleasant, nutty taste. The beany tasting ingredients are removed (distilled out) merely by the proper application of heat (hot air or steam), and no chemicals should ever be used for processing. In particular one should prohibit for bleaching and deodorising of soya flour the application of such powerful oxidising agents as sulphur dioxide, peroxides and chlorine, since they oxidise the fats present in the soybeans as well as the phosphatides, with the formation of toxic compounds. Bleached soya flour is, in addition, deprived of its valuable vitamin A. Manufacturers should be induced to print on the label of their soya flour whether chemicals were used in its manufacture.

On the other hand, one should avoid "under-processed" soya flours, where the beany taste is not completely eliminated and the keeping quality is poor. Customers would welcome the readiness on the part of the manufacturer to mail at request a free sample of the unblended soya flour used in his products.

"Soybeans can be converted into flour, which in turn can be used with wheat flour in making bread, cake, cookies, pies, doughnuts, etc. Soybean flour is a concentrated, wholesome, nourishing and economical food. It is rich in protein, not only in quantity but also in quality. It is rich in fat, in minerals and in most of the known vitamins. It is a cheap source of proteins, fat, minerals and energy. It is alkaline in reaction. When mixed with wheat flour in any proportion not exceeding 20 per cent. of the mixture, it makes a most appetising, attractive and nourishing loaf of bread." (Statement from the Food Research Division, U.S. Department of Agriculture. See previous reference of paper by Bailey, Capen and LeClerc.)

Soya Flour in Cake Making

In another recent publication from the Food Research Division of the U.S. Department of Agriculture[4] it is stated that good gold cake and pound cake were made with mixtures of 20 per cent. soybean flour and 80 per cent. wheat flour. For gold cake the incorporation of 10 to 15 per cent. of soya flour (whole soya flour) has given also good results. In pound cake, when soybean flour is used, better pound cake can be made with soft winter wheat flour than with the same grade of hard wheat flour. Soya flour does not contain gluten, and for this reason, as well as for others, favourably influences the crumb texture and the grain. In the United States processed whole soya flour is being successfully used in plum and fig pudding (25 per cent.), in coffee cake and coffee rings (15 to 25 per cent.), in doughnuts (7 per cent.), pancake flour and breakfast foods.

Specific Properties

Whole soya flour stands unique among other foods since it imparts richness and combines a shortening effect (due to the 20 per cent. oil) with an emulsifying property similar to that of egg yolk (due to the 2 per cent. of phosphatides and the 40 per cent. of protein).

In England shea butter has been used as a constituent of so-called pastry flour, in which all the ingredients necessary are incorporated.[5] The emulsified shea butter is sprayed on to the flour, and so an intimate mixture is obtained. With such prepared flours there is always a danger of rancidity. Processed whole soya flour would be a valuable asset in such pastry flours since it contains 20 per cent. of oil which does not readily turn rancid due to its being dispersed in minute droplets *inside* the cells of the flour particles, where it is protected from rancidity by the phosphatides.

For its emulsifying properties, finely milled whole soya flour is finding increased favour in England for "cold mix" ice-cream powders (in amounts of 7·5 per cent.), replacing the expensive powdered dried egg yolk.[6] Soybean paste as an emulsifying agent has been studied by the Laboratory of Home Economics of the University of

California,[7] and a good substitute for eggs for salad dressing obtained:

"In preparing the mayonnaise-like salad dressing a paste was first made from sifted, finely ground flour. The flour was mixed smoothly with five parts by weight of distilled water, boiling with stirring for two minutes over direct heat, cooked for fifteen minutes in a covered double boiler and cooled. Weighed portions of this paste were beaten in the usual way with a hand or electric rotary beater, while a moderate stream of oil was added. Water was added as needed for thinning, and lastly the requisite amounts of acid, dry seasonings and colouring were incorporated. Two parts of paste to twelve or fourteen of oil and three of additional liquid will yield a product of satisfactory flavour and texture, but this does not represent the maximum capacity for oil. Soybean paste as emulsifying agent in salad dressing has several merits. Among these are: (1) Low cost, (2) ease of shipping and storing of beans, (3) heat sterilisation of paste immediately before use, (4) the incorporation of rather a large volume of liquid for a given viscosity. Emulsions made with soybean appear to be less sensitive to low temperature storage than those stabilised by egg, but to be more sensitive to excessive amounts of seasonings, particularly salt."

The emulsifying capacity of whole soya flour is strongly pronounced, and good use can be made of this property in the flour confectionery trade, enabling the manufacturer to put out a richer cake at less expense. In general, the housewife is somewhat more lavish in the use of the expensive ingredients than is the commercial baker.

Old-fashioned pound cake furnishes an example. In this case, the housewife generally uses equal parts of sugar, flour, eggs and butter, while the commercial baker's formulæ call for appreciably less butter and eggs and the inclusion of vegetable shortening and milk. The difference in the formula makes a difference in the taste and quality of the cake, as the eggs and butter both add flavour as well as improve the texture and general appearance.

On the basis that the baker's share of the cake produced is about one-fourth of the total consumed, it is estimated that the annual value of all cake made in the United States by all agencies is approximately $700,000,000. To obtain a larger share of this vast business is the baker's aim, and in this he can succeed if he is wise enough to make the kind of cake enjoyed by the housewife and her family.

REFERENCES

[1] President of General Mills, Inc., U.S.A.

[2] L. H. Bailey, R. G. Capen, and J. A. LeClerc: "The Composition and Characteristics of Soybeans, Soybean Flour, and Soybean Bread," *Cereal Chemistry*, vol. xii, 1935, p. 441.

[3] According to the recently signed trade agreement.

[4] L. H. Bailey and J. A. LeClerc: "Cake and Cake-Making Ingredients," *Cereal Chemistry*, vol. xii, 1935, p. 175.

[5] See *Food Industries Manual*, issued by "Food Manufacture", p. 32.

[6] T. I. Woods: "Ice-Cream Powders," *Food Manufacture*, June, 1934, p. 201.

[7] A. M. Field, B. H. Alexander, and E. B. Sylvanus: "Soybean Paste as an Emulsifying Agent," *Science*, vol. 77, 1933, p. 91.

EAST MALLING RESEARCH STATION REPORT

THE Annual Report (Twenty-Third Year), 1935, of the East Malling Research Station, East Malling, Kent, contains 242 pages and can be purchased by non-members for 4s. post free. The report is published in two parts. That dealing with the general development and activities is presented by the Executive Committee to the Annual General Meeting; it is printed as a supplementary report mainly for the use of the Committee and Members and is circulated separately to the Members. The Annual Report of research work is made up of four sections, as follows: I, The Experimental Farm; II, General Review of Research Work, with Summaries of Papers published during the Year; III, Preliminary Research Reports; IV, Bulletins for Fruit Growers. The general programme of research work has been revised during the year, and Section II includes complete lists of papers published by the staff during 1935, together with summaries of those papers not readily accessible to the Members.

BREAD CONSUMPTION AND FLAVOUR

(Continued from page 331.)

Sir John Orr points out that the amount of flour consumed per head per week is relatively constant in all the six income groups into which he divides the population. Thus an increased income does not mean an increased consumption of flour, and the general increase in the standard of living during these fifty-four years will not involve an increased purchase of flour. But as income increases, the amount of flour consumed as the more expensive biscuits and confectionery increases, and so the amount eaten as bread will therefore decrease.

The march of time cannot be reversed, and this drop in bread consumption consequent upon an improved standard of living cannot be altered without a change in our present methods. The advertising scheme now in progress must undoubtedly do good, and any improvement in the quality of bread as made to-day will be a decided help. Thus while it does not seem that the drop in bread consumption can be blamed upon the wrong flavour of present-day bread, an improvement in its flavour is to be sought and adopted when found. In this connection the baking of bread with a maximum of crust should be very seriously considered by all bakers who do a good-class trade. People will always pay for what they like, and most people do like crusty bread. A reduction in the size of loaf baked from 2 lb. to 1 lb., or from 1 lb. to the size of a roll, increases very considerably the ratio of crust to crumb, and what is more, while it may not increase the total amount of bread consumed, it enables a baker to increase his profit for a given weight of bread sold, for the price of the unit of bread purchased need not be decreased in proportion to its weight. The extra labour involved in turning out such articles as rolls, or really good Vienna bread, is far more than compensated by the price that can be obtained.

INFORMATION and ADVICE

Canned Hams—Tomato Soup—Soup Powders—Heat Penetration—Brining Problems—White Meat Glaze—Water Ices

Canned Hams

2,032. *We have an enquiry for our Canned Hams from U.S.A., but we are instructed to obtain Ante- and Post-Mortem Certificates, which we suppose will be obtained from our suppliers, also a certificate stating that the hams were packed under official supervision, and signed by the Government Inspector. In this latter case, we should be pleased to know the correct procedure to obtain this, and any further advice will oblige.* (Lancs.)

We understand that the suppliers would be the people to apply to for Ante- and Post-Mortem Certificates.

With regard to a signed certificate by the Government Inspector that the hams have been packed under official supervision, this, we have been informed, is unknown in this country, and no official certificates are issued. The only supervision exercised is under the Factory Acts, and this does not relate to the actual packing.

Tomato Soup

2,033. *Can you please supply us with a formula for a Tomato Soup?* (Sunderland.)

The following is a typical recipe:

Tomato purée	18	gal.
Onions, peeled and chopped fine	18	lb.
Garlic, peeled and chopped fine	18	oz.
Beef dripping	9	lb.
Beef extract	7½	,,
Beef stock	7½	,,
Cornflour	13	,,
Water	12	gal.
Salt	3	lb.
Sugar	1	,,
White pepper	2	oz.
Ground ginger	1	,,
Water	10	gal.
Red colouring matter.		

Simmer onions, garlic, dripping and water in a pan for an hour, adding boiling water to maintain original volume.

Add beef extract and stock, and boil. Then pass through pulping machine, and return to pan. Add purée, ginger, salt, sugar and pepper, and simmer for 5 minutes.

Make the cornflour into a paste with 5 gal. cold water and stir well into soup. Make up to total volume of 39 gal. with boiling water.

Fill hot into cans and sterilise at 245° F. for 30 minutes for 2-lb. cans.

Soup Powders

2,034. *One of our clients wishes to packet soup powders, such as tomato, green pea, celery, lentil, onion, mushroom, etc. Could you let us have a formula for the mixture? We presume the idea is to have a powder which will only require the addition of water and boiling for a few minutes.* (London.)

The bases generally consist of mixtures of various flours. For instance, pea soup might consist of 80 lb. pea flour with 40 lb. cornflour, and 40 lb. potato flour. In the case of lentil soup, lentil flour would be used in place of pea flour. These flours are flavoured with onion powder and salt. Lentil and tomato soups are sweetened by the addition of sugar, and pea soup would probably contain a little gelatin.

Beef extract would be added to pea and lentil soup, and with tomato soup ground cassia and curry powder might be used. If desired, dried tomato could be used in place of the purée.

In manufacture the usual plan is to place all the ingredients, except the beef extract, in a steam pan, and after heating and stirring all the time, the beef extract is added, and heating and stirring continued until the product is dry, when it is pressed into cubes.

Heat Penetration

2,035. *Information is required concerning the various methods of carrying out penetration tests for Christmas pudding material which is to be canned, and also particulars of the actual time necessary to destroy mould spores.* (Burton-on-Trent.)

As the material in question is to be canned, it may be *sterilised* and will keep for an indefinite period.

To effect heat penetration tests, a ready way is to use a short maximum thermometer. By this means may be found out the time required for the very centre of the pudding to reach a desired temperature. This will depend upon the size and composition of the material, and must be ascertained for any given article. There is no "formula" for this, as the variations in size and composition are infinite. It may be mentioned that if the very middle of a pudding be brought up to 240° F., in a few minutes all spores will be destroyed.

Christmas pudding contains preservative materials such as sugar, spices, etc., and if the centre of a pudding is maintained at 212° F. for three hours, it should be practically sterile.

Brining Problems

2,036. *We would be grateful to have information regarding the brining and pickling of walnuts, also particulars regarding brining of lemon peels and lemon halves.* (Beyrout.)

It was suggested that experiments be carried out along the following lines:

Brining of Walnuts

Walnuts must be brined twice.

Place the walnuts in a 50-gal. cask and then head out and pour in a brine of 2½ lb. of dairy or pickling salt to each gallon of water. Head up the cask and place weight on it in order to keep the nuts from floating. Cover the nuts with brine and allow to stand for 7 to 10 days, or until the nuts ferment, after which the brine should be run off. Then head up and fill with a brine consisting of 3½ lb. of pickling salt to each gallon of water, which should be added until the cask is full. Allow to stand for 4 weeks or more.

Pickle Walnuts (1)

Run off the brine and place walnuts in baskets to drain, after which place the baskets in a tank or vat with open steam pipe and cover. Gently blow in steam until the walnuts are soft and black. Then place the walnuts in the spiced vinegar, which is made up as follows:

Vinegar, 18 grain	20 gal.
Whole allspice	1½ lb.
Black peppers	1½ ,,
Japanese chillies	½ ,,
Caramel	1½ gal.

Boil all together for 15 minutes.

Allow to stand for 7 days and fill into glass jars with vinegar, which is prepared as follows:

Malt vinegar, 18 grain	24 gal.
Whole allspice	1½ lb.
Black peppers	1½ ,,
Japanese chillies	½ ,,
White sugar	24 ,,
Ginger	4 ,,
Chopped garlic	1 ,,
Raw onions	2 ,,
Caramel	1 gal.

Boil gently for 30 minutes, and then pass through a jelly bag until bright. Before capping, place a piece of ginger, four chillies, a few black peppers over the top.

Brining of Lemon Skins

The lemon skins should be packed in layers in the cask. When full close the cask and fill through the bung-hole with a saturated solution of pickling salt and water with 2 fluid ounces of SO_2 to each gallon of brine. Allow to stand for 24 hours, after which take out the bung and fill with brine. This will have to be done every 24 hours until the cask is full, and then about every 14 days, as the skins must be kept under the brine. Iron utensils must be avoided.

Brining of Lemon Halves

Place the freshly cut halves of lemons in a cask and head up. Then fill with a saturated solution of pickling salt and water (*i.e.*, 4½ lb. salt to each gallon of water) and add 1 fluid ounce of SO_2 to each gallon of brine. Allow to stand for 48 hours, then take out the bung and fill with brine. Repeat very 14 days, as the lemons must be kept under brine.

White Meat Glaze

2,037. *Can you please furnish information on the manufacture of white meat glaze?* (London.)

A typical formula is as follows:

Clear white gelatine	25 parts
Farina or cornflour	25 ,,
Water	approx. 50 ,,
Salt	2 ,,

The gelatine is soaked in water for about an hour, and dissolved in its own absorbed water. The farina or cornflour is mixed with the necessary amount of water to make a thin cream and added to the gelatin solution along with the salt and enough water to make the required weight. The mixture is kept hot until incorporation is completed, and rubbed through a fine hair sieve and cooled to the required temperature for dipping.

Water Ices

2,038. *We shall be pleased to have any information you can give us in respect to the manufacture of water ices, and at what point the citric acid is incorporated.* (Salford.)

Care should be taken in the preparation of water ices to get a smooth texture. The ingredients required are sugar, citric acid, water, a suitable fruit flavour and a stabiliser, such as gelatine.

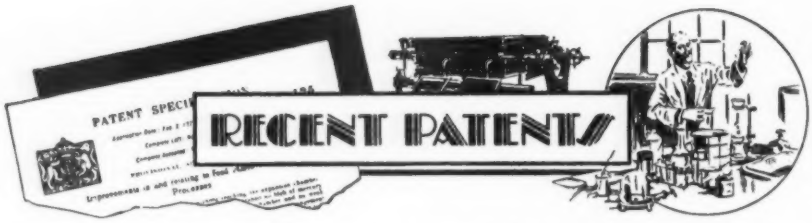
Smoothness is obtained by using large quantities of sugar, but this is apt to give rise to what is known as "bleeding." Part of the mix remains unfrozen, and concentrates, eventually settling to the bottom. To overcome this trouble, glucose is used in place of some of the sugar.

According to Feltham, in his book, *The Making of Ice-Cream*, the ingredients required for a gallon mix would be the following:

Water	6½ pints
Sugar	2¼ lb.
Glucose	¾ ,,
Citric acid (dry crystals) ..	1¼ oz.
Gelatine	1 ,,

The sugar is dissolved in the water by heating; then add the glucose, which immediately melts into the hot sugar mixture, then the citric acid crystals and the powdered gelatine, which should have been previously moistened with some of the water. The whole is then strained and cooled. The flavouring is added in the freezer.

Another method is to mix together in a dry condition the sugar, citric acid and gelatine. The water is then warmed to 100° F., the glucose added and stirred in, and the dry mixed powders added and stirred until dissolved. As soon as this is done the mix is strained and cooled.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

18738. BUEB, H., and BUEB, J.: Apparatus for drying coffee beans. July 6.

18872. HILL, W. C.: Treatment of citrus fruit. July 7.

18978. I.G. FARBENINDUSTRIE AKT.-GES.: Process of preserving green fodder. July 8.

19281. BROADHEAD, R. M.: Moulded edible jellies. July 11.

19581. LEWANDOWSKY, K.: Machines for treating chocolate, etc. July 14. (Germany, June 22.)

19696. PARKER, W.: Oxygenation of milk. July 16.

20056. AKTIESELKABET DEN DANSKE MAELKEKONDENSERINGSFABRIK: Baking powder. July 20. (Denmark, April 14.)

20105. INTERNATIONAL YEAST CO., LTD.: Treatment of yeast. July 20. (United States, July 23, 1935.)

20227. BEROZELLER, S.: Process for improving soya beans. July 21.

20562. DAVIES, T. E.: Heat-treatment of tins, etc., containing preserved food. July 24.

20705. HOPPE APPARATUS- UND MASCHINENBAU, F., and HOPPE, F.: Apparatus for filling caramels. July 27.

Complete Specifications Accepted

449,526. GRAVES, H. C. H., and VITAMINS, LTD.: Manufacture of biscuits for therapeutic purposes.

449,601. SCHOLLER, H.: Apparatus for carrying out the saccharification of cellulose material. (Divided out of 27750/34.)

450,033. COPE AND COPE, LTD., and COPE, W. J.: Apparatus for cleaning eggs. (Addition to 416,069.)

450,117. MILLAR, J. H., and GUINNESS, SON AND CO., LTD.: A process of preparing a soluble food extract from brewers' yeast.

450,529. WEIZMANN, C.: Yeast or protein preparations. (Cognate application 31413/34.)

450,693. I.G. FARBENINDUSTRIE AKT.-GES.: Preservation of green fodder.

450,754. KNOCH, H.: Surface apparatus for the heat treatment of milk and other liquids.

450,798. JENSEN, O. V.: Process for preventing the infection of milk.

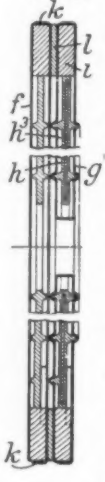
Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 25s. each.

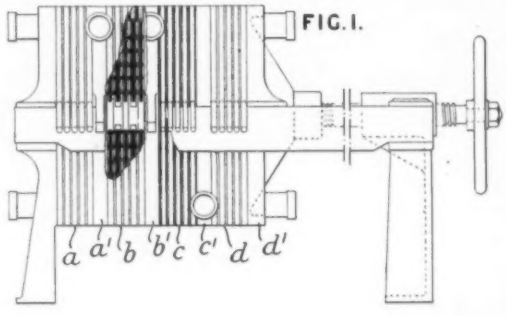
444,073. GROUP NO. XIII. **Plate heat-exchangers.** STONE AND CO., LTD., J., Deptford, London, and COTTER, E. W., 28, Croham Valley Road, South Croydon.

FIG. 3.



Apparatus for heating and/or cooling milk, etc., comprises alternate plain and spirally corrugated hollow plates *f*, *g* clamped together with rubber gaskets *l* and division plates a^1, b^1, c^1, d^1 between them to form brine and water-cooled sections *a*, *b* respectively, a regenerative section *c*, and a water-heated section *d*. Each hollow plate consists of a centrally apertured spirally ribbed rubber plate *h*, which may be reinforced by a metal disc h^3, mounted within a metal frame *i* and enclosed by a casing formed of plain or corrugated sheet-metal covers secured together by a circumferential welded joint *k*. The milk flows in turn through each hollow plate from the periphery to the centre and thence back to the periphery on opposite sides of the rubber plates, while the heating or cooling medium flows alternately from the periphery to the centre and from the centre to the periphery through the successive spiral passages between the hollow plates.

FIG. 1.



446,529. **Improving the digestibility of milk preparations.** HALL LABORATORIES, INC., 304, Ross Street, Pittsburg, Pennsylvania, U.S.A.

On the hypothesis that only ionised calcium contributes to the hardness of milk curd, a process for improving milk preparations consists in adding to the latter an alkali metal phosphate in quantity capable of reducing the free ionic concentration of calcium (responsible for curd formation) while not entirely destroying the solubility of the calcium. The preferred agent is sodium hexametaphosphate, which may be added to raw milk just before bottling or pasteurising, or to prepared milk after completion of any processing operations which might convert the metaphosphate into orthophosphate. A sodium-calcium-metaphosphate complex is formed and gradually undergoes hydrolysis after absorption in the body. While the minimum proportion of sodium hexametaphosphate is 0·04 to 0·05 gm. per 100 c.c. milk, the proportion recommended in the case of pasteurised milk (60° C. for 30 minutes) is 0·075 gm. per 100 c.c. (Convention date, U.S.A., November 10, 1933.)

446,762. **Treatment of rice.** STEEL BROS. AND CO., LTD., 6, Fenchurch Avenue, London, E.C. 3, and GIBBON, S. H.

A light gelatinous appearance contrasting favourably with the yellow colour of ordinary parboiled rice or the brittle and somewhat chalky appearance of rice in its initial form is imparted to rice by subjecting it in the well-soaked condition (water content exceeding 15 per cent.) to dry heat in a chamber maintained at 350° to 450° C. and discharging it when its temperature reaches 90° to 98° C., a treatment involving a period of about 2 minutes. The apparatus comprises a soaking tank, a rotary heating drum, and a drier. In an example, 50 lb. soaked rice preheated to 65° C. were passed into a drum with an ordinary temperature of 440° C., and rotating at a speed of 5 revolutions per minute, discharged at 96° C. 35 seconds after the complete charge had been inserted, transferred to a rotary drier, and dried to a water content of 12 per cent. Apart from the attractive appearance of the final product, it is very suitable for milling.

446,792. **Stabiliser for shortening.** INDUSTRIAL PATENTS CORPORATION, Union Stockyards, Chicago, Illinois, U.S.A.

Hydrogenated sesame oil has been found effective in the past (E.P. 395,971) as an anti-oxidant for lard shortening. According to the present specification, a similar effect is achieved by incorporating with the edible animal or vegetable fat a distillate obtained as a by-product during steam-deodorisation of hydrogenated sesame seed. (Convention date, U.S.A., November 12, 1934.)

448,572. **Packing perishable materials.** STURGES, T. E., and SOUTHWELL AND CO., LTD., C., Jacob Street, Dockhead, London, S.E.

After placing the perishable material in the open receptacle, such as a jar, the

surface is exposed to radiant heat in order to form a dry top layer on the material. While still exposed to heat, an airproof cover is fitted to the container, partial evacuation thus taking place in the space between the desiccated top of the material and the cover as the container cools. The residual air will also be sterile as a consequence of the heating. Materials with a high sugar content are preferably exposed for 40 to 60 seconds to the heat of a grill spaced about 1 in. from the surface of the material and capable of raising the temperature of the air in contact with the material to 300° to 400° F.

448,702. **Toffee manufacture.** WALTERS, J., SMITH, H., and WALTERS' PALM TOFFEE, LTD., Palm Works, Westfield Road, London, W. 3.
Apparatus claimed for scoring and shaping slabs of toffee comprises scoring blades carried by a supporting block and arranged to form rectilineal enclosures and a series of ejecting plungers mounted so as to slide in the supporting block. Each plunger head is located in an enclosure and is provided with a plane or embossed concave underface, which meets the side walls of the plunger head so as to form sharp edges and corners.

448,800. **Butter flavours.** IMPERIAL CHEMICAL INDUSTRIES, LTD., Thames House, Millbank, London, S.W. 1.
A new flavouring substance capable of replacing butter itself in bakery products is claimed to be obtained by fractional distillation of butter-fat while taking precautions to avoid substantial decomposition of the fat or its vitamins. According to the method outlined, vacuum-dried butter fat (which is semi-solid at 20° C.) is melted in a de-gassing chamber, also maintained at a high vacuum (about 0·001 mm. mercury), whence it flows in a thin film over a heated surface which may conveniently take the form of an internally electrically heated vertical tube whose top end is closed and rounded so as to act as a distributor. The inside temperature should not exceed 240° C. Within a distance of 1 in. or less from the heating surface is a condensing surface, the intervening space being kept at the same high vacuum. So-called "molecular distillation" takes place under these conditions; the fat does not actually boil, but the path traversed by the fat molecules from heating surface to condensing surface is so free from obstruction owing to the high vacuum that relatively few of them are deflected back to the molten fat. The distillate so obtained, amounting to about 30 per cent. of the total butter fat used, is richer in vitamin A than the original fat (Carr and Price reaction), possesses the familiar smell and taste of butter, and imparts to high-class bakery products the same taste and nutritive value as a very much larger proportion of butter. The residual 70 per cent. represents a concentrate of the shortening constituents originally present in the butter, and is claimed to be superior to margarine as an ingredient of pastry products. Reference is made to Specification No. 303,078, which claims a process for short-path high vacuum distillation of organic substances in general. (Convention date, Netherlands, December 16, 1933.)

NEW COMPANIES

Batchelor's Peas, Limited. To carry on bus. as wholesale pea mchts., canners and preservers, etc. Nom. Cap.: £100 in 5s. shares. Dirs.: Not named. Qual. of dirs.: None required. Subs.: E. T. Speller, 25a, Holdenby Road, S.E. 4 (clk.); E. H. Hill, 47, Briar Avenue, Norbury (clk.).

Devon and Mowbray Cheese Company, Limited. To carry on the bus. of dlrs. in milk, cheese, milk products, etc. Nom. Cap.: £100. Subs.: C. Polaine, 137, Bournemouth Park Road, Southend (clk.); W. L. Wightman, 19-21, Moorgate, E.C. 2 (clk.).

Hildebrandt (C. F.) Mills (London), Limited. (316,846.) 1, Broad Street Place, E.C. 2. To carry on the bus. of millers, importers, exporters, canners and preservers of peas, potatoes, vegetables, etc. Nom. Cap.: £6,000. Dirs.: Not named. Subs.: H. C. Holman, 1, Broad Street Place, E.C. 2 (chartered secretary); H. V. Longley Cook, ditto.

Locatelli, J., Limited. To carry on the bus. of importers, exporters, and mnfrs. of and dlrs. in Italian cheeses and other produce, etc. Nom. Cap.: £500. Subs.: A. E. Maby, 5, Thavies Inn, E.C. 1 (solr.); W. T. Whitlaw, 5, Thavies Inn, E.C. 1.

Malins, A. (Waterloo), Limited. 40, Dean Street, Waterloo, near Liverpool. To take over the bus. of sausage mnfrs. and meat salesmen cd. on at Waterloo as "A. Malins". Nom. Cap.: £500. Dirs.: W. O. Malins, 54, Whitehill Lane, Northfield, Birmingham (permt. dir. and ch.); J. G. Malins, 8, Berwick Street, Bootle, Liverpool; Mrs. M. Ronald, 10, Park Lane, Bootle, Liverpool; Mrs. K. Crebbin, 122, Rimrose Road, Bootle, Liverpool.

Marks and Son (1936), Limited. 221, Tottenham Court Road, W. 1. To carry on the bus. of aerated and mineral water and other liquor mnfrs. and dlrs. and numerous other businesses. Nom. Cap.: £2,000. Dirs.: M. Marks, 93, Ridgmount Gardens, W.C. 1 (prmnt. dir. and ch.); P. Marks, 93, Ridgmount Gardens, W.C. 1; Mrs. M. Kessel, 652, Old Kent Road, S.E. 15; Miss C. Marks, 93, Ridgmount Gardens, W.C. 1.

Plashet Manufacturing Company, Limited. 78-84, Plashet Grove, E. 6. To carry on the bus. of food product mnfrs., etc., and to take over, if possible, the bus. of a table jelly mnfr. cd. on by H. Huntman. Nom. Cap.: £1,000 in £1 shares. Dirs.: To be appointed by the subs. Qual. of dirs.: 5 shares. Subs.: W. Symonds, 53, Doughty Street, W.C. 1 (co-secretary); E. A. Heymer, Upalong, 41, Nesta Road, Woodford Green, Essex (clk.).

Ratcliff (Electric), Limited. Electric House, 83, Wicker, Sheffield, 3. To carry on the bus. of refrigeration and mechanical engineers, etc. Nom. Cap.: £3,000. Dirs.: R. P. Ratcliff, 338, Abbey Lane, Sheffield, 8 (permt. gov. dir. and ch.); Florence Ratcliff, 338, Abbey Lane, Sheffield, 8.

Ridgway and Company (Maesteg), Limited. (316,871.) To carry on the bus. of mnfrs. of and dlrs. in mineral and aerated waters, etc. Nom. Cap.: £1,000. Permt. dirs.: F. Ridgway, The Bungalow, Priory Terrace, Maesteg; P. Ridgway, 61, St. Michael's Road, Maesteg. Qual. of dirs.: One share.

Roberts Patent Filling Machine Company, Limited. (316,919.) Deane Road, Bolton, Lancs. To take over the bus. of mnfrs. of filling machinery cd. on at Bolton as "Roberts' Patent Filling Machine Co." Nom. Cap.: £12,000. Permt. dirs.: Sir Wm. Edge, Ribble Lodge, Lytham St. Annes, Lancs; K. Edge, Hastings House, Lytham St. Annes.

Stelcon (Industrial Floors), Limited. To take over the bus. undertaking and goodwill of the Stelcon Department of Langley London, Ltd., and all or any of the assets thereof, including the trade mark "Stelcon"; mnfrs. of and dlrs. in natural and artificial stone, etc. Nom. Cap.: £3,000. Subs.: H. Reynolds, 7, Arundel Street, W.C. 2 (solr.); W. T. Gorst, 7, Arundel Street, W.C. 2.

Tuckers (Totnes) and Marshall, Limited. 1, Southampton Row, W.C. 1. To take over the bus. of mnfrs. of confectionery formerly cd. on by Tucker and Sons, Ltd., at Totnes, Devon, and elsewhere, and the bus. of mnfrs. of crystallised fruits formerly cd. on by James Marshall (London), Ltd., in London and elsewhere. Nom. Cap.: £10,000. Dirs.: J. S. Marshall, 128, Wynchgate, Winchmore Hill, N. 21; N. A. Smith, Downs Edge, Findon, Sussex.

Windsor Refrigerator Company, Limited. 16, Eastcheap, E.C. 3. To carry on the bus. of refrigeration and cold storage engineers, etc. Nom. Cap.: £3,000 in £1 shares. Dirs.: H. F. Wood, Wynnegate, Old Windsor, Berks; Mrs. W. M. A. Wood, Old Windsor, Berks. Remun. of dirs.: As voted by the company.

Woodheads Canonbury Brewery, Limited. To carry on the bus. of brewers, etc., and to enter into an agreement with Edmund Woodhead and Sons, Ltd. Nom. Cap.: £80,000 in 40,000 pref. shares of £1 and 160,000 ord. shares of 5s. Dirs.: To be appointed by the subs. Qual. of dirs. (after May 30, 1936): £500. Remun. of dirs.: £100 each per annum. Subs.: J. Barnes, 7, Walcot Gardens, Kennington, S.E. 11 (accnt.); F. J. Groombridge, 110, Douglas Avenue, E. 17 (clk.); and five others.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

LATEST TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

A FINS GOURMETS. — 566,511. **Substances used as food or as ingredients in food.** Bocquet, 36, Rue du Havre, Yvetot, Seine-Inférieure, France. August 5.

ALFA. — 568,613. **Butter.** Findlay Murchie, trading as Murchie's Creameries, Lochrin Place, Edinburgh. July 1. (Associated.)

Registration of this trade mark shall give no right to the exclusive use of the devices of cows.

The applicant undertakes to use the mark only on butter produced in Scotland.

ALKORTA. — 566,307. **Canned fish.** Tomas Alkorta Balenciaga, 4a, Andia No. 2, San Sebastian. July 1.

APICULT.—566,300. **Substances used as food or as ingredients in food for human consumption only, all containing honey.** Kathleen Hazlehurst Whitting, trading as Apicult, 49, Church Street, Kensington, London, W. 8. July 1.

Registration of this trade mark shall give no right to the exclusive use of the word "Apicult".

BARKAN.—569,463. **Substances used as food or as ingredients in food.** Baird Wolton and May, Ltd., 45, Borough High Street, London, S.E. 1. July 22.

BLUE BUNNY.—566,463. **Canned fruits and canned vegetables.** Pacific Coast Canners, Incorporated, 503, Market Street, San Francisco, California, United States of America. July 29.

C. B. L.—567,500. **Substances used as food or as ingredients in food.** Charles Benjamin Lamb, Sandymount, Richhill, County Armagh, Northern Ireland. August 5.

Registration of this trade mark shall give no right to the exclusive use of the letters "C. B. L."

COUNTRY LIFE. — 566,795. **Condensed milk.** Dried Milk Products, Ltd., Dominion Buildings, 2, South Place, London, E.C. 2. (Associated.) August 5.

Condensed milk and goods of a like kind will be struck out from the goods of Registration No. 426,050 (2317) if and before the applicants' mark is registered.

COUNTRY LIFE. — 566,796. **Condensed milk.** Dried Milk Products, Ltd., Dominion Buildings, 2, South Place, London, E.C. 2. (Associated.) July 29.

Registration of this trade mark shall give no right to the exclusive use of the cow devices and pastoral scene.

CREAMYADE.—566,973. **Custard powder.** S. Dodman and Sons, Ltd., 2, Banyard Road, London, S.E. 16. July 1.

Registration of this trade mark shall give no right to the exclusive use of the word "Creamyade".

DAIRY DALE.—568,741. **Canned fruits.** J. and J. Lonsdale and Co. (London), Ltd., Fennings Wharf, London Bridge, London, S.E. 1. July 1.

FLEKE. — 567,798. **Beef suet.** John Cecil Adam and Douglas Alexander Adam, trading as John Adam and Son, 78, Salamander Street, Leith, Edinburgh. July 15.

FLUFF.—568,945. **Edible oils and edible fats.** Thomas Hedley and Company, Ltd., Phœnix Buildings, Collingwood Street, Newcastle-on-Tyne. July 15.

GOLD LEAF.—567,393. **Bacon, ham, and eggs (for food).** I. Beer and Sons, Ltd., 15, King Street, West Smithfield, London, E.C. 1. (Associated.) July 29.

HULVITA.—568,526. **Substances used as food or as ingredients in food, but not including foods for poultry, pigs, cattle, horses, or sheep, and not including any goods of a like kind to any of these excluded goods.** Thomas Hulbert and Sons, Ltd., New Era Flour Mills, Worsley Street, Hulme, Manchester. July 29.

MAVCO.—569,233. **Butter, cheese, eggs, and cream.** The Maple Valley Dairy Company, Ltd., 271, Queen Street, Montreal, Canada. July 22.

JIFFY. — 567,569. **Condensed milk.** Fussell and Co., Ltd., 6 and 8, Eastcheap, London, E.C. 3. July 1.

MORNING DEW. — 567,237. **Canned meats, canned fish, canned fruits, and canned vegetables.** Reginald Malcolm Broadhead, Westlea, Carisbrooke Drive, Nottingham. (By consent.) July 22.

MINESSA.—568,740. **Fruit drinks (not alcoholic, not medicated, and not aerated) and fruit drink powders.** St. Martin Preserving Co., Ltd., Slough Trading Estate, Slough, Buckinghamshire. August 5.

NU-FLO.—568,958. **Self-raising flour and cake flour.** Davison and Pickering, Ltd., 13 to 17, Stowell Street, Newcastle-on-Tyne. July 22.

OAK FIELD. — 568,824. **Mushrooms, mushroom powder (for food), sauces, ketchups, pickles, and soups.** Rural Industries and Properties, Ltd., 66, Victoria Street, London, S.W. 1. July 29.

PRESTONIC. — 568,295. **Syrups (not alcoholic and not medicated), cordials (not alcoholic), and beverages (not alcoholic, not medicated, and not aerated), and preparations for making the said goods.** The Apollinaris Company, Ltd., 4, Stratford Place, Oxford Street, London, W. 1. (Associated.) July 22. (By consent.)

ROWNTREE'S. — 566,236. **Drinking chocolate and cocoa.** Rowntree and Co., Ltd., The Cocoa Works, Wigginton Road, York. (Associated. (July 22.) (By consent.)

SEA QUEEN.—569,067. **Flour for sale in the United Kingdom (except in Scotland) and for export.** Weaver and Co., Ltd., Swansea Flour Mills, Swansea. (By consent.) (July 29.)

STOWAWAY.—569,590. **Dates, nuts for food, dried fruits.** Barrow, Lane, and Ballard, Ltd., Pudding Lane, Eastcheap, London, E.C. 3. July 29.

THE GREYHOUND.—565,340. **Nuts (for food).** Marion and Ruzand, Rue Aymard - Durivail, Saint - Marcellin (Isère), France. (By consent.) July 29.

565,511.—**Butter, cream, eggs, and cheese.** Robertson's and Hallett's Dairies, Ltd., Isle of Wight Creameries, Petticoat Lane, Newport, Isle of Wight. February 26.